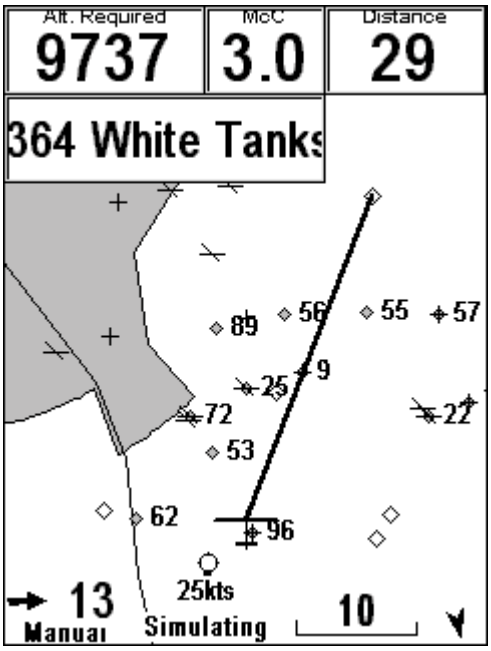
Cambridge Aero Instruments

Pocket-NAV User's Manual



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Pocket-NAV User's Manual

1.0 Introduction

The Pocket-NAV was developed by Cambridge Aero Instruments (CAI) to enhance the GPS-NAV secure flight data recorder, the L-NAV, and the S-NAV glide computers by providing a simpler user interface. The powerful, low cost, high-resolution graphics capability allows moving map navigation and reduces the number of screens required to present the pilot with necessary information. The Pocket-NAV simplifies navigation, final glide, and task entry, and significantly reduces pilot workload when navigating near special use airspace and GPS start/finish gates. The Pocket-NAV provides moving map navigation and will accept and display airspace data and up to 6000 waypoints.

The moving map simplifies GPS navigation by displaying angles and distances graphically instead of numerically. Bearing to a destination, the relative positions of nearby airports, and the proximity and direction of airspace are easily seen and interpreted with a quick glance at the map.

The Pocket-NAV is designed to be the primary user interface for the GPS-NAV and the L-NAV or S-NAV. We recommend that you leave the L /S-NAV on one screen throughout the flight, and that you don't use the GPS-NAV display. All the information provided by changing screens on the L/S-NAV and by the GPS-NAV display is available on the Pocket-NAV. The L/S-NAV screen provides vital information such as the average climb rate and real time head wind/tail wind. If you don't change screens, the same numbers remain in the same place on your panel at all times. Vector wind, navigation, and final glide information are presented in easy to read formats on the Pocket-NAV screen. Additional information and functions, such as changing the MacCready setting or the navigation destination, are easily accessible on the Pocket-NAV touch screen. Using the instruments in this fashion significantly reduces pilot workload.

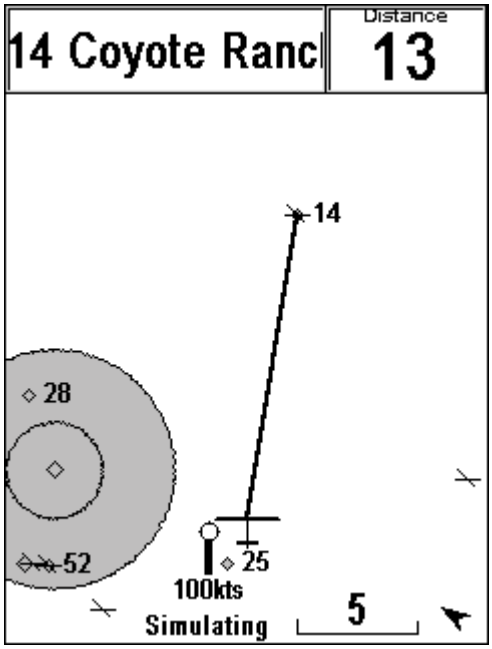

Figure 1. Pocket-NAV moving map, main flying screen.

This manual applies to Pocket-NAV Plus, the full capability version of the Pocket-NAV. If you are using the Standard or Starter versions, refer to the notes on these versions for the portions of this manual that are not applicable.

2.0 Setting up the Palm or Pocket-PC

The Pocket-PC was recently released as the next version of the Palm-PC. Pocket-PCs use Windows CE Version 3.0, and Palm-PCs use Windows CE Version 2.x. Compaq Aero 1520 and 1530 Palm-PCs can be upgraded to Pocket-PCs. The Palm and Pocket-PCs require different versions of the Pocket-NAV program. Pocket-NAV for the Pocket-PC will not run on the Palm-PC. Pocket-NAV for the Palm-PC will run on the Pocket-PC, but an annoying task bar will cover part of the screen. The Pocket-PC is faster than the Palm-PC, but has no real advantages for the Pocket-NAV program.

We use the term Pocket-PC generically, when there is no difference between the Palm-PC and Pocket-PC.

Touch Screen

The Pocket-PC uses a touch sensitive screen that responds to touching or tapping and dragging your finger or the stylus across it. The touch screen provides a very direct and easy to use interface for the Pocket-NAV. Touch controls for use in flight are large so that they can be accessed easily with a finger in rough air.

On Palm-PCs (not Pocket-PCs) the task bar should be set on **Auto hide** to make use of the maximum screen area. Touch **Start**, **Settings**, **Taskbar,** and select **Auto hide**.

The Reset Button

The reset button is inside a small hole on the back of the Pocket-PC, usually near the upper left. This button stops all running programs without disturbing any saved information. Push it if a program gets stuck or won't run, or if you get a repeated comm port error. Once the Pocket-NAV program is running and operating correctly, you should not have to push reset. If you find you have to push reset in flight for any reason please let us know.

Program Buttons

Pocket-PCs have program buttons, four along the bottom and one or two along the left side, that run the built-in programs, "Contacts", "Calendar" etc. These can be a problem because you usually don't want to see your calendar during a glider flight. You can set the buttons to activate various programs (including the Pocket-NAV program) by selecting **Start, Settings,** and **Buttons**. Some button selections, such as the **Start Menu** and **SIP** or **Input Panel** (these are what the small keyboard is variously called) can be useful. These buttons return you to the Pocket-NAV program if they are pushed twice.

If you set one of the buttons to the Pocket-NAV program you can always return to Pocket-NAV by pushing the button. The Pocket-NAV program executable file must be in the "Start Menu" subdirectory to be accessible from the **Start** menu or the program buttons. (See Section **2.2** Software Setup.)

If you leave the buttons on the default settings and inadvertently push one, you can return to the Pocket-NAV program by re-selecting it on the **Start** menu. You can also select it on the list of active tasks in Q-Launch, if Q-Launch is available on your Pocket-PC. On the Pocket-PC (not the Palm-PC), the task bar may appear at the top of the screen if you use Q-Launch while running Pocket-NAV. Re-start and exit Q-Launch, touch **Start** at the upper left, and select the Pocket-NAV program. We recommend setting one of the program buttons to the Pocket-NAV program, as these procedures are not always easy to do in flight.

We also recommend setting one of the buttons to the "SIP" on the Palm-PC or "Input Panel" on the Pocket-PC. Items such as the **WP Arrival Radius** are set using the input panel. On the Palm-PC, this is also accessible from the task bar at the bottom of the screen. On the Pocket-PC, there is no way to access the input panel while the Pocket-NAV program is running unless one of the buttons is set to activate it.

The Input Panel or Stylus Keyboard

As mentioned above, changing some items, such as the **WP Arrival Radius** or the **Polar Data**, requires using the stylus keyboard, a small keyboard that appears at the bottom of the Pocket-PC screen. The keyboard is variously called the "SIP" or the "Input Panel" on Palm or Pocket-PCs. The keyboard is activated differently on the Palm-PC than on the Pocket-PC. On the Palm-PC, touch the bottom edge of the screen so that the task bar appears and then touch the keyboard icon. Touch the keyboard icon, near the center, again to make the keyboard go away.

On the Pocket-PC, there is no way to access the input panel while the Pocket-NAV program is running unless one of the buttons is set to activate it. See the previous section.

The keyboard works best with the stylus and is not intended to be used during flight.

Program Versus Storage Memory

Memory is not usually a problem on the units with 16 megabytes or more. IGC flight log files are large, and downloading several flight logs from the GPS-NAV can eventually use too much memory. If you are using a compact flash card, the log files will be loaded onto the card and will not use memory in your Pocket-PC.

If your Pocket-PC reacts slowly or presents a dialogue box about memory, you will need to allocate additional memory for programs. Exit the Pocket-NAV program, or push the reset button on the back of the Pocket-PC**.** Touch **Start**, **Settings**, **System**, and **Memory**, and move the arrow to the left to increase program memory.

The Cassiopeia E-10 may not have enough memory to handle large data files. You may need to trim the files on your PC.

2.1 Hardware Set Up

The Pocket-NAV works on the Cassiopeia E-10 and E-11 and the Compaq Aero Palm and Pocket-PCs and will be adapted to others as they become available. Pocket-PC batteries are not adequate for flying for several hours, and power is provided to the Pocket-PC through your GPS-NAV using the cable or mounting system provided by Cambridge. The Pocket-NAV software should be purchased from your Cambridge dealer. If you wish, you can acquire the Pocket-PC elsewhere, in which case you will need only the software and cable from Cambridge. The software is provided on a floppy disk, on the World Wide Web, or a compact flash card (for the Compaq Aero only), and you can install it yourself.

The cable between the GPS-NAV and Pocket -PC provides power to the Pocket -PC and allows the two units to communicate. The Pocket-NAV works with all models of the Cambridge Aero Instruments GPS-NAV. You must have data recorder firmware Version 5.5 or greater; we recommend Version 6.0 or greater. The Pocket-NAV has been designed to replace the GPS-NAV display, but will also work in conjunction with it.

The Pocket-PC should be mounted where the touch screen is easily accessible and visible. CAI can provide an articulating mounting system with a molded cradle and cable for the Compaq 1500 series that can be mounted on the instrument panel or along the canopy rail. Avoid covering the reset button if you use Velcro to mount your Pocket-PC.

2.2 Software Set Up

The Palm-PC and the Pocket-PC use different versions of the Windows CE operating system and therefore need different versions of the Pocket-NAV program. Use PalmNAV-CE2.exe for Palm-PCs and PalmNAV-CE3.exe for Pocket PCs. If you are not sure which version you have, look under **Start**, **Settings**, **System**, and **General** or **About**. If it says Windows CE Version 2.x use PalmNAV-CE2. Use PalmNAV-CE3 for Windows CE Version 3.x.

Program and data files need to be loaded onto your Pocket-PC, or they may need to be upgraded or added to if they have already been loaded by your Cambridge dealer. Files can be loaded using Microsoft ActiveSync, which is provided with Pocket-PCs, or using a Compact Flash Card. Active Sync has been available since the fall of 1999. Older Palm-PCs were shipped with another program, variously called Windows CE or Windows CE Services. ActiveSync provides the same functions only it works much better. If you are using Windows CE Services we recommend that you upgrade to ActiveSync, which is available free from Microsoft's web site.

ActiveSync

Program and data files need to be loaded onto your Pocket-PC. The Compaq 1530 Palm-PC, and all Pocket-PCs, provide a file explorer similar to "Windows Explorer". The older Palm-PCs do not directly provide a resource to see which files are present; i.e. there is no "Windows Explorer" or equivalent. On these units, Palm-PC files can only be accessed from within an operating program (for example, Note Taker or the Pocket-NAV program), or from a PC connected to the Palm-PC and using the ActiveSync software. ActiveSync should have been provided on a CD with your Palm-PC or Pocket-PC. Install ActiveSync on a PC, and connect the Pocket-PC to the PC using the cable and cradle that came with your Pocket-PC. You will be able to view and delete files from the Pocket-PC and copy or move files to and from the PC (see Appendix C). ActiveSync will not operate while the Pocket-NAV program is running because they both use the communications port.

Compact Flash Cards

Compact flash cards provide an additional storage medium for Pocket-PCs and can be used to transfer data to and from a PC. We recommend using a compact flash card to protect your data and programs. All current Pocket-PCs will run down both their main and backup batteries if left idle for a week or two, and all the data and programs you have loaded will be erased. The compact flash card allows easily recovering from this. (The Cassiopeia E-10 and E-11 do not provide for easy data transfer to and from a compact flash card, so the cards are not as useful with these units.) Downloading flight logs from the GPS-NAV can eventually fill up the memory on your Pocket-PC. If a compact flash card is present, flights will be stored on the card and will not use Pocket-PC memory.

If you are using a Pocket-PC or a newer Palm-PC, an alternative (and easier) method of loading the Pocket-NAV software is to use a compact flash card. Your Cambridge dealer can provide a card with the Pocket-NAV software installed (see Appendix D). Please specify the model of your Pocket-PC. The Compaq 1500 series provides a file explorer and files can be copied to it from the card, or can be used directly from the card. Compaq 2100 series units include a built in CF Backup/Restore function which can be used to load the Pocket-NAV software onto your Palm-PC. (The Cassiopeia E-10 and E-11 do not have the CF Backup/Restore function or the file explorer. Waypoint, special use airspace files and flight logs can be stored on a compact flash card and used on these units.) Instructions are provided with the card. Data files can also be transferred using the card. Most laptop computers have a PCMCIA or PC card slot that will allow access to the compact flash card as though it were a disk drive. Compact flash card readers are available for most desktop PCs as well.

Files and Directories

The *PalmNAV-CEx.exe* program should be stored in the "Start Menu" sub-directory of the "Windows" directory on the Pocket-PC. This allows you to run the program from the **Start Menu** by touching **Start Menu, PalmNAV-CEx**. On Compaq 1500 series Pocket-PCs, there is **File Explorer** that allows you to copy files and run programs. You can store the *PalmNAV-CEx.exe* program anywhere, for example on a Compact Flash card, and run it from the **File Explorer**. The file must be in the "Start Menu" subdirectory to be accessible from the **Start Menu** or the program buttons.

For the Cassiopeia E-10 or E-11, the "Fonts" sub-directory in the "Windows" directory should contain the MS Sans Serif fonts. This file can be copied from the "Fonts" sub-directory of the "Windows" directory on any Windows PC. Adding the fonts is not necessary on Compaq Palm or Pocket-PCs.

Airspace and waypoint data files are stored in the "My Documents" directory or may reside on a compact flash storage card. For English language versions, the "My Documents" directory already exists on your Pocket-PC. If you are using a compact flash storage card, the "My Documents" directory should be created on the storage card and the files stored in it. If a compact flash card with files on it is present in the Pocket-PC, only files that are on the card will be available to the program. Files that end in the ".txt" extension can be viewed and edited on the Pocket-PC using the built in Note Taker program.

If you are using your Pocket-PC for other things and you may find storing data files in "My Documents" awkward. SUA and waypoint files can be stored in additional subdirectories, if desired. Add a subdirectory called "SUAsandWPS" to the "My Documents" directory on the Pocket -PC, or to the compact flash storage card. Do not put the new subdirectory in the "My Documents" directory on the compact flash card, put it in "Storage Card" if you are creating it on the Pocket -PC or directly on the card if you are creating it on a PC.

Waypoint files should be in the standard CAI import file format. Data is available for many soaring sites around the world from the Worldwide Soaring Turnpoint Exchange at **http://acro.harvard.edu/SOARING/JL/TP**. You can also create waypoint files yourself. An example is given in Appendix A.

Cambridge customers and others from around the world have contributed waypoint and airspace data to the World Wide Soaring Turnpoint Exchange, making it an extremely useful source of information. We are extremely grateful, as instrument manufacturers and as pilots, to those who have created, contributed to, and maintained this effort.

Special use airspace (SUA), roads, rivers, borders and start/finish gates can be entered for display on the map. SUAs include restricted airspace, wave windows, control zones and any other airspace that requires the pilot to understand boundaries. Examples and instructions for entering SUAs are given in Appendix B. Airspace data is also available from the Worldwide Soaring Turnpoint Exchange.

Flight log files can be transferred from the GPS-NAV to the Pocket-NAV and to a compact flash card. They can be downloaded on exiting the program, or by selecting **GPS-NAV Data** on the **More Configure** screen. (See Section **4.9.7**.) The files are put into a "Flights" directory within the "My Documents" directory on the Pocket-PC, or into a "Flights" directory on the compact flash card, if a card is present. The directories will be created if they do not exist already. Flights are saved as both secure ".cai" files and ".IGC" format text files. Note that transferring several files can use up your Pocket-PC memory if you are not using a compact flash card.

Passwords

A password is required to enable the Pocket-NAV to communicate with the GPS-NAV. If the GPS-NAV has not been enabled, the Pocket-NAV will start in Standard or Starter mode, and an **Upgrade** button will appear. Touch the **Upgrade** button to enter the password. Obtain your password from Cambridge Aero Instruments. We will need the four-character serial number (e.g. C0KM) of your GPS-NAV data recorder. Once the GPS-NAV has been enabled, the Pocket-NAV will not ask for the password again. The Pocket-NAV software will only work in Plus mode with an enabled GPS-NAV. If you borrow a GPS-NAV that has not been enabled, the Pocket-NAV will only operate in the Starter or Standard mode (depending on the version of the GPS-NAV) without entering the password for that GPS-NAV.

3.0 Running the Pocket-NAV Program

Starting the Pocket-NAV Program

Touch the bottom edge of the screen to make the task bar appear, touch **Start** and **PalmNAV-CEx** to start the program. On the Compaq 1500 series Pocket-PCs, you can run the program from a Compact Flash card. Touch **Start, QLaunch, File Explorer**. Find the *PalmNAV-CEx.exe* program on the Storage Card and touch it twice.

If the Pocket-PC is not connected to a GPS-NAV, the program will run the simulator. If a GPS-NAV is connected when the program is started, the Pocket-NAV program will communicate with the GPS-NAV and run using the GPS-NAV position data.

If the program is simulating and you wish to use it with a GPS-NAV, you must re-start the program. The program should exit automatically if it is plugged into a GPS while simulating. (If the comm port is not free, the program will not exit automatically. To free the comm port, exit the program that is using it, or push the reset button on the back of the Pocket-PC.) If the program has been running with a connection to a GPS you must exit, disconnect the GPS-NAV, and re-start the program to use the simulator. (To exit, press the **distance** box in the upper right, press **Quit Palm-NAV**, and press **Yes**).

If a GPS-NAV is connected, the message "GPS Wait" will appear if the GPS-NAV does not have a valid satellite fix, as when the GPS-NAV is initializing.

When you connect some Pocket-PCs to a GPS-NAV, they try to connect with it as if it were a PC. The message "Connecting to Host" will appear. You can either touch "Cancel" or wait for the message to disappear before starting the Pocket-NAV program.

Troubleshooting

If the message "Unable to open the comm port" appears when you start the Pocket-NAV, it is because the Pocket-PC thinks it is still connected to a PC. Usually, when you disconnect the Pocket-PC from a PC, it will make a descending scale sound indicating that it has disconnected. If this does not happen, it will not connect to the GPS-NAV. Unplug the cable connecting the GPS-NAV to the Pocket-PC. You should hear the descending scale, and the Pocket-NAV program should now be able to connect to the GPS-NAV when you plug it back in. If this does not work, push the reset button, a small hole on the back of the Pocket-PC, with the stylus.

Occasionally, the Pocket-NAV my get stuck during start up, for example, due to the cable becoming disconnected during the transfer of waypoints. It should recover eventually (in ½ to one minute), but you can also push the reset button and start over.

Pocket-PCs occasionally get stuck and do not respond properly. If the program will not run, push the reset button and try again.

3.1 Choosing Waypoint files in the Pocket-NAV and GPS-NAV

Both the Pocket-NAV and GPS-NAV can contain waypoint files. The Pocket-NAV can hold many more waypoints (6000 versus 250), and can handle longer names and comments. The fact that both can contain waypoints makes it possible for duplicates, or worse, for similar waypoints to exist. (For example, two turnpoints with the same name and number but different coordinates.) This section describes how the file handling works.

If your flying requires less than 250 waypoints, the simplest approach is to load the waypoints in the GPS-NAV and to select "Use GPS-NAV waypoints only?" on the Pocket-NAV. Airspace data can be loaded separately in the Pocket-NAV. If you use this approach, you can ignore the rest of this section. If you require more than 250 waypoints, see if you can divide them into turnpoints (to be used for tasks) and other waypoints, such as airfields and landing fields. Load the turnpoints in the GPS-NAV and the remaining waypoints in the Pocket-NAV, and select "Use both GPS-NAV and Palm-NAV waypoints?". In this case, points selected on the Pocket-NAV will behave differently with the L-NAV and GPS-NAV display depending on whether or not they are in the GPS-NAV. (See Sections **3.3.5** and **3.3.6**.)

The Pocket-NAV always loads waypoint and SUA data files that were used the last time the program was run, if the files are available in the "My Documents" directory, the "My Documents\SUAsandWPs" subdirectory or on a compact flash "Storage Card" in the Pocket-NAV. Files on a compact flash card must be in the "My Documents" subdirectory or the "SUAsandWPs" subdirectory on the card. It then reads the waypoint data, if any, from the GPS-NAV. There are four possible outcomes concerning waypoints:

1) No waypoints.
2) Waypoints from the Pocket-NAV files only.
3) Waypoints from the GPS-NAV only.
4) Waypoints from both the GPS-NAV and the Pocket-NAV.

In the first case, no waypoints from either, a screen will appear (see Section **3.3.1 Waypoint and SUA Files** below) allowing you to select files from the Pocket-PC. These files must have been loaded in the "My Documents" directory or the "My Documents\SUAsandWPs" subdirectory on the Pocket-PC, or in the "My Documents" or "SUAsandWPs" directory on a compact flash "Storage Card". If no data has been loaded onto the Pocket-NAV, the screen will be empty. You can select and load waypoint and SUA files from this screen.

In the second case, there is no data at all in the GPS-NAV. The first 250 waypoints from the Pocket-NAV are loaded into the GPS-NAV. This is not likely to occur because the GPS-NAV retains the last waypoints loaded into it.

In the third case, there are no waypoints in the Pocket-NAV and the GPS-NAV waypoints are loaded into the Pocket-NAV and used. This is a common way to use the system. SUA files can be loaded on the Pocket-NAV and they will be re-loaded automatically the next time it is started, and the GPS-NAV waypoints will be used.

In the fourth case, there are waypoints on both the GPS-NAV and the Pocket-NAV. This requires pilot input to decide which data to use. A dialogue box appears asking if you wish to "Use GPS-NAV waypoints only?". If you answer yes, they will be loaded into the Pocket-NAV and the Pocket-NAV waypoints will be discarded. Note that you can re-load the Pocket-NAV data at any time by touching the **distance** box, **Configure** and **SUA, WP Files**. If you answer "no" to "use GPS-NAV waypoints only?" another dialogue box will appear asking if you wish to "Use both GPS-NAV and Palm-NAV waypoints?". If you select yes, the Pocket-NAV will use the data from both. If you select no, a dialogue box will ask if you wish to "Use Palm-NAV waypoints only?". If you select yes, the Pocket-NAV data will be sent to the GPS-NAV, overwriting what is there. Before the data is sent to the GPS-NAV, a final warning box will appear, confirming that you want to "Replace GPS-NAV waypoints". If you select no, both the Pocket-NAV and GPS-NAV data will be used.

If you use both the Pocket-NAV and GPS-NAV waypoints, it is possible to have duplicate points depending on the contents of each instrument. The purpose of this feature is to allow, for example, loading 200 turnpoints on the GPS-NAV and 2000 landing sites for the area on the Pocket-NAV.

When changing sites, you can load the new waypoints on either the Pocket-NAV or the GPS-NAV. If you load the data on the Pocket-NAV, select "Use Palm-NAV waypoints only?" and the new data will be loaded onto the GPS-NAV. If you load the new data on the GPS-NAV, select "Use GPS-NAV waypoints only?" as above.

Note that, unless you elect to replace the GPS-NAV waypoints, you can always start again by selecting the **distance** box, **Configure** and **SUA, WP Files** from the main screen. (See Sections **3.3.1 Waypoint and SUA Files** and **4.8.3 SUA, WP Files**.)

3.2 Running the Simulator

Starting the Simulator

If a GPS is not connected, the program will run the simulator when started as described above. If the program has been running with a connection to a GPS you must exit, disconnect the GPS-NAV, and re-start the program to use the simulator.

If a GPS is not connected the program will start simulating. Simulation is indicated by a small control stick, airspeed, and the word "Simulating" at the bottom of the screen as in Figure 2. The simulator speeds up, slows down, and turns by dragging the little control stick near the bottom of the screen. Making the stick longer or shorter controls speed, moving it to the right or left controls turn rate and direction. Figure 2 shows the control stick at the bottom in a left turn at 90 mph. It is easier to work the simulator using the stylus.

Simulating Flight

On start up, the simulator places the glider at the home waypoint, or the middle of the loaded SUAs if no waypoints are loaded. If there are several home waypoints (designated with an "H" attribute in the waypoint file), the first one will be used. If there are none, the first waypoint will be used.

All of the controls and displays work while simulating as described in the following chapters. This manual will be easier to understand if you use the simulator while reading it.

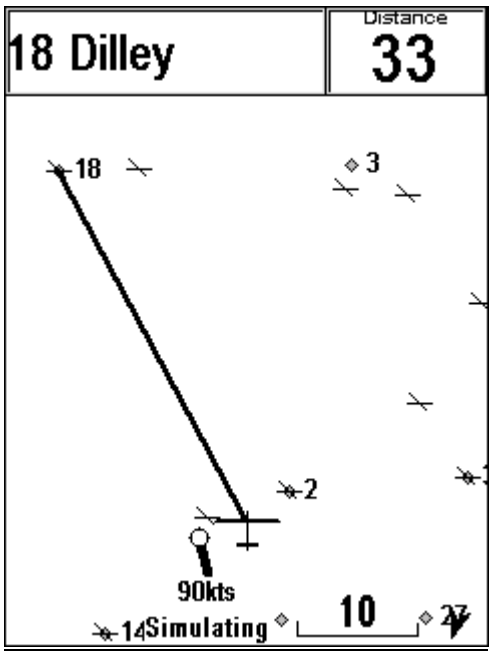

Figure 2. Main flying screen in simulator mode.

3.3 Running the Program

3.3.1 Waypoint and SUA Files

If an enabled GPS is connected, waypoints can be transferred to the Pocket-NAV. If there is no waypoint data in the GPS-NAV and no waypoint files were used on the Pocket-NAV the last time it was run, the waypoint/SUA selection screen shown in Figure 3 will appear. (Section **3.1 Choosing Waypoint files in the Pocket-NAV and GPS-NAV** explains the options depending on what has been loaded into the GPS-NAV and Pocket-NAV.) You can also select this screen at any time in order to change the SUA and waypoint data in use by touching the **distance** box, **Configure** and **SUA, WP Files** from the main screen. (See Section **4.8.3 SUA, WP Files**.)

The airspace data is trimmed to the area of the waypoint database. For example, if you load the contest turnpoints for Bayreuth, Germany, and the SUA data "Europe.sua", which includes airspace for most of Europe, the SUA data will be trimmed to include only those airspaces that overlap the rectangle bounding the contest turnpoints.

You can load additional waypoint and airspace files by putting them in the "My Documents" folder of the Pocket-PC using the ActiveSync software that is provided with the Pocket-PC, or by loading them onto a compact flash card. If a compact flash card is present in the Pocket-PC, only files that are on the card will be available. See Section **2.2 Software Set Up**. Palm-PCs with only 4 megabytes of memory can become overloaded if you use very large data files.

Available files are shown and selected (by touching them) on the right side of the screen, and files that have been added (touch **Add**) and will be used by the program are on the left. Add the files you want (or delete those you don't want, **Del**) and press **Done**. Multiple SUA and waypoint files can be loaded. If you have loaded large files there will be a long pause.

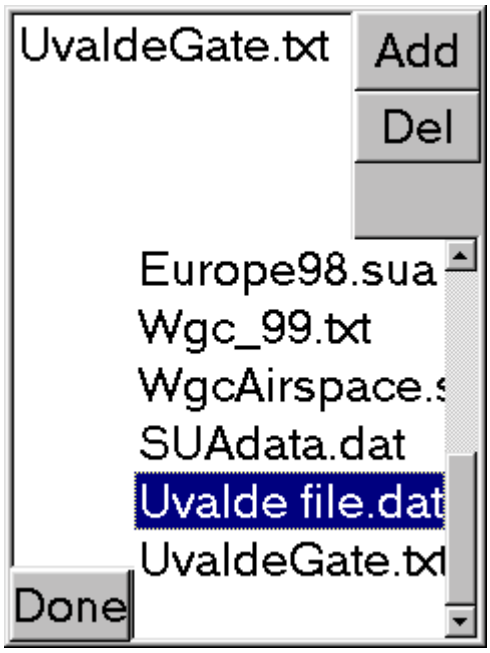

Figure 3. Add “SUA, WP files”.

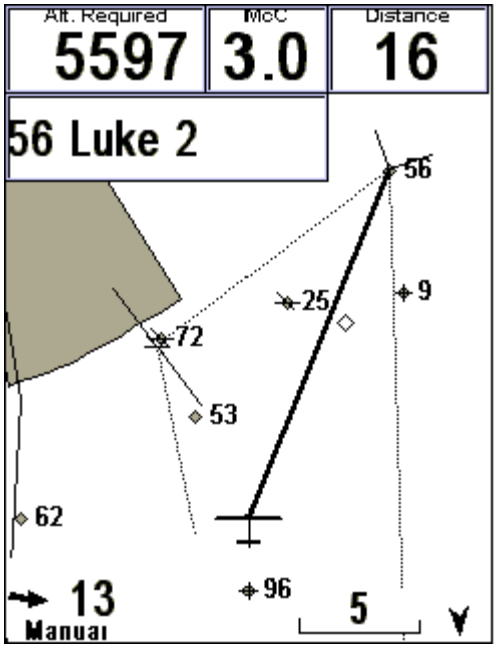

Figure 4. The Main Flying Screen

3.3.2 The Main Flying Screen

Figure 4 show a typical flying screen. The selected waypoint, Luke 2, turnpoint 56, is shown near the top of the screen. The distance to it is at the upper right. The glide altitude required to reach Luke 2, 5,597 feet, as shown at the upper left, and the MacCready setting is in the center. The differential glide altitude, the difference between the altitude required and your current altitude, can alternatively be displayed. The wind speed and direction are shown at the lower left. The wind arrow points in the direction that the wind is traveling with respect to the ground. The wind has been entered manually, but the automatic vector wind from the L/S-NAV, or a wind calculated from the drift while circling if there is no L/S-NAV connected, can be displayed and used for the final glide.

The thick line shows the direction of the selected waypoint (the bearing) from the glider, which is depicted near the bottom of the screen. We recommend flying with the map oriented in the direction of flight, or in "track up", as shown in Figure 4. When you get used to using the moving map in track up you will find that you have eliminated a step in interpretation. In track up, when the bearing line is straight up you are headed directly toward the waypoint.

Touching the screen near a waypoint or airspace area on the map will display information about it. If you touch more than one airspace or waypoint, a list will appear allowing you to select the item you want more information about.

If a task is entered, it is shown with dotted lines. Airspace zones are filled with gray. (Part of the Sky Harbor airspace surrounding Phoenix, Arizona is shown in Figure 4.) Airports are indicated by a horizontal and an angled line suggesting crossed runways. Table 1 shows the waypoint symbols. Attribute symbols for waypoints are set in the waypoint data files. Multiple attribute symbols are combined; for example turnpoint 25 in Figure 4 is a turnpoint and an airport. The map can be configured to show combinations of turnpoint numbers, names, other waypoint numbers, and names. See Section **4.9.6 Show On Map**.

Symbol	Item	Attribute
◈	Turnpoint	T
+	Landable	L
⊁	Airport	A
◇	Other waypoints	S, F, H or M

Table 1. Map waypoint symbols

Figure 4 also shows a start gate perpendicular to the first leg of the task (near turnpoint 72 in the figure) and a depiction of the FAI sector at turnpoint 56. These can be turned on or off as required.

The line near the left edge of the screen that passes near turnpoint 62 is an interstate highway.

North Arrow

The north arrow is at the bottom right of the screen. It indicates a glider heading of about 175 degrees in Figure 4. The scale bar, to the left of the north arrow, indicates the length of the bar, 5 miles in Figure 4.

Zooming or Changing Map Scale

The scale can be changed by touching the scale number and touching the up or down arrows that appear. The scale can also be changed with the rocker switch on the upper left side of the Pocket-PC case.

Panning

You can pan the map by dragging your finger across the screen. This works best if you move slowly. Panning can be used to move the sailplane icon to another portion of the display, for example, to see what is behind you. Panning very far is not useful in flight because you can no longer tell where you are once the plane icon moves off the screen. **Reset Pan** appears at the upper right, and touching it will reset the map to your present location. It will reset automatically after 30 seconds. It is possible to fly into an SUA without warning if you pan off the map.

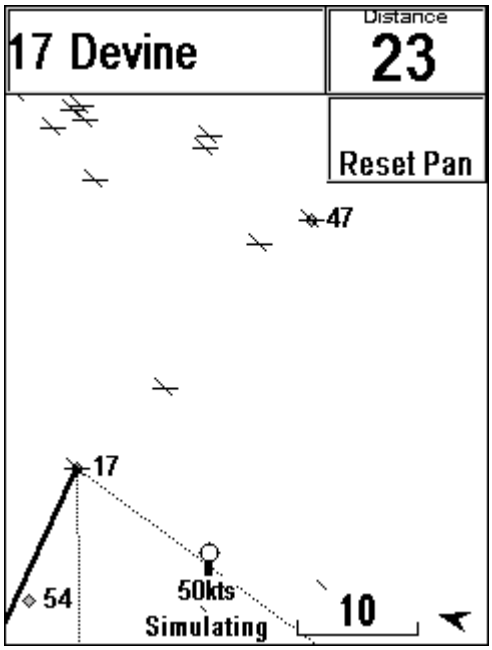

Figure 5. **Reset Pan** appears at the upper right of the map if it has been panned. Note that the plane icon has moved off screen.

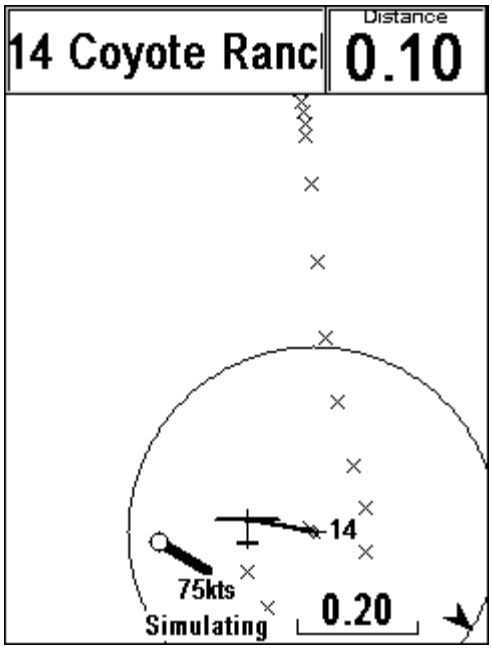

Figure 6. The arrival radius is shown when approaching a selected waypoint.

Arrival Radius and FAI Sector

The arrival radius is displayed on the map when headed to the selected waypoint. If the **Show FAI Sector** box has been checked on the **Task Configuration** screen, the FAI sector will show at task turnpoints when a task has been entered. (Touch the **distance box, Configure, Task Configuration,** and **Show FAI Sector** to turn this option on.) The radii and sectors don't show at large scales, the sector lines are three kilometers and the arrival radius is set by the pilot, usually one half kilometer, or one quarter mile in the USA. (See Figure 6.) Points logged by the GPS-NAV are marked on the map behind the glider. At small scales the logged points are marked with X's as in Figure 6. If you see an X within the arrival circle or FAI sector, you have made the turnpoint. The most recent 5000 points are shown on the map. This feature can be shut off by touching the **distance** box, **Configure, More Configure** and **Tracks On.** (See the configure screens below.)

Airspace

Airspace areas are filled with gray on the map. If you have loaded one or more airspace data fields and no airspaces appear, be sure that the "Ignore SUAs above:" altitude is not set to zero. See Section **4.4.4 SUA Warnings** below.

Choosing Waypoints

Touching a waypoint or airspace area will cause information about it to appear at the top of the screen. (See Figure 7.) The waypoint comment field and waypoint latitude and longitude are optionally displayed, as chosen by touching the **distance box, Configure, More Configure** and **Show On Map**.

If you touch several waypoints at once, a list will appear allowing a choice. Touching the **Go To** box will make the waypoint the active navigation point.

Touching the active waypoint name at the top left of the screen shows the last active waypoint number and name below the current active waypoint (Figure 8). Touching the last active waypoint name will make it the active navigation waypoint. This allows you to quickly switch back and forth between two navigation points.

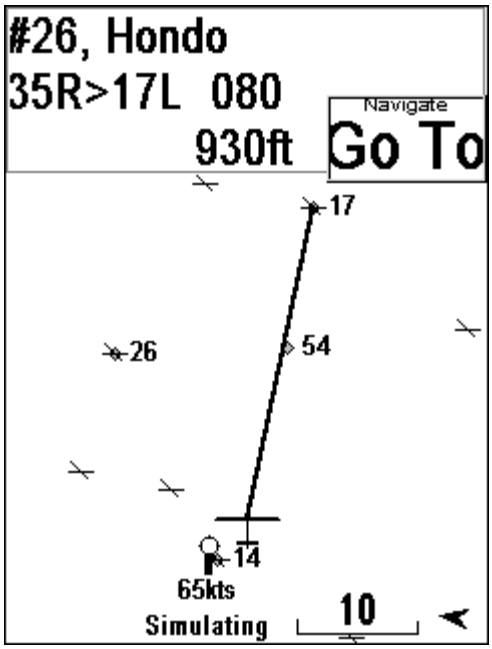

Figure 7. Touching a waypoint on the map displays information about it.

Choosing Waypoints when a Task Has Been Entered

If a task has been entered (see section **4.2 Edit Tasks** below for entering tasks), the current task turnpoint (highlighted with a gray background), the previous task turnpoint, and the next task turnpoint will appear when the active waypoint name at the top left of the screen is touched. The last active waypoint will also appear at the top of the screen, in place of the current active waypoint name. This allows immediately selecting the current task turnpoint, the previous task turnpoint, the next task turnpoint in the task list, or the last active waypoint (which may not have been a task point).

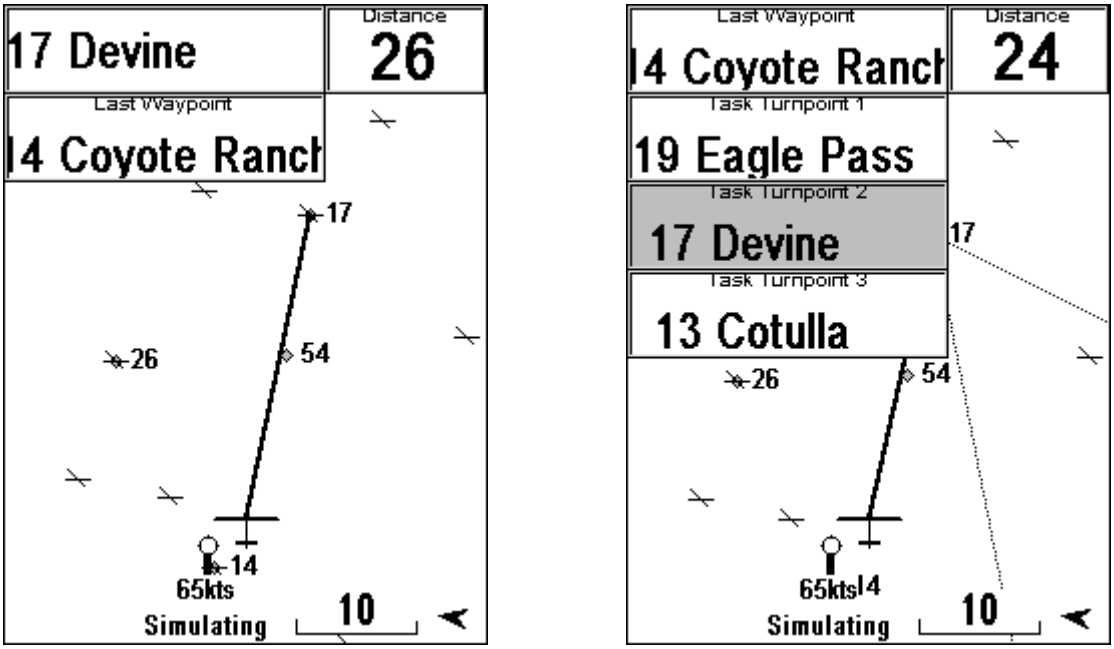

Figure 8. After touching the active waypoint at the top left of the screen, one of these screens will appear (depending on whether or not you have entered a task) allowing changing to a new active waypoint. Touch the desired waypoint on the map, or select it from those in the boxes.

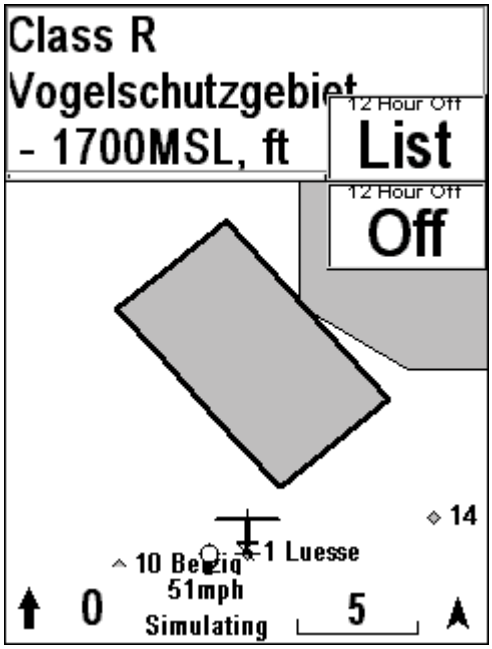

Figure 9. Touching and SUA shows information and allows shutting it off.

Turning SUAs off

Touching an SUA will show information about it at the top of the screen, and will also make the **Off** and **List** buttons appear. (See Figure 9.) These allow you to shut the currently selected airspace off for 12 hours, and

to access the list of currently shut off airspaces to view them and to turn them back on. If you inadvertently shut off an airspace, touch another airspace on the map, touch **List**, touch the airspace name in the list, and touch **On**. (See Section **4.8.4 12 Hour Off List**.) The **List** button will not appear if no airspaces have been turned off. The 12 hour off list can also be accessed through **Configure**, as described in Section **4.8.4**.

3.3.3 Final Glide Computer

Touch the **distance** box, **Configure, More Configure** and **Final Glide** to access the final glide options, check **Final Glide Info On** to activate the final glide computer. (See Section **4.9.3 Final Glide** for a discussion of the various final glide options.) The final glide altitude and MacCready setting will appear at the upper left of the screen. (See Figure 10.)

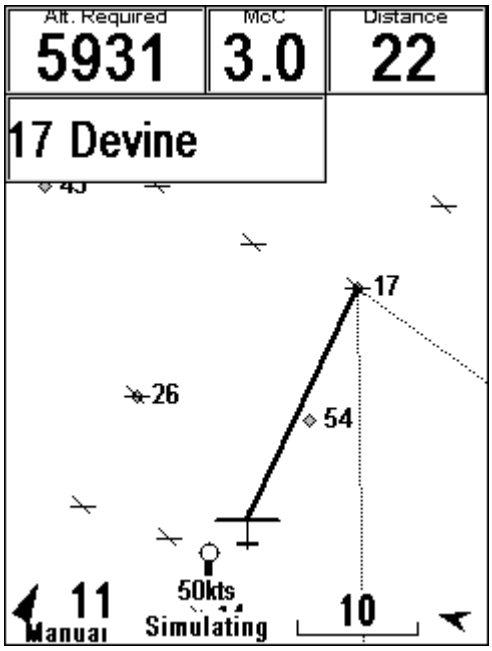

Figure 10. Main Flying Screen with final glide computer enabled.

The final glide computer uses the distance (in the upper right of the screen), the elevation of the active navigation destination (Devine in Figure 10), the glider polar (see **4.9.4 Polar Data** for setting the polar) the vector wind (discussed below), and the arrival height margin (see Section **4.9.3 Final Glide**) to find the altitude required. If you are using an L/S-NAV flight computer, the vector wind can be sent automatically to the Pocket-NAV. If not, the Pocket-NAV will calculate a vector wind based on the drift in thermals.

Final Glide Around Multiple Turnpoints

If a task has been entered, the final glide can be computed around multiple turnpoints. Touch the active waypoint name at the upper left of the screen and a **To Finish** button will appear on the right. Selecting **To Finish** will display the final glide distance and altitude for the remainder of the task.

Vector Wind

The vector wind (wind speed and direction) is depicted at the lower left. The arrow points in the direction that the wind is traveling with respect to the ground. This is opposite to the direction number set by the pilot; a wind of 5 knots and 180 degrees is from the South, and the arrow will therefore point North. The wind

speed and direction can be set by touching the wind icon and the up and down arrows for speed and direction (Figure 11). The wind direction is the direction the wind is coming from.

Wind units are kilometers per hour if kph has been selected as the "Speed" unit on the **Units** page and knots if mph or kts have been selected.

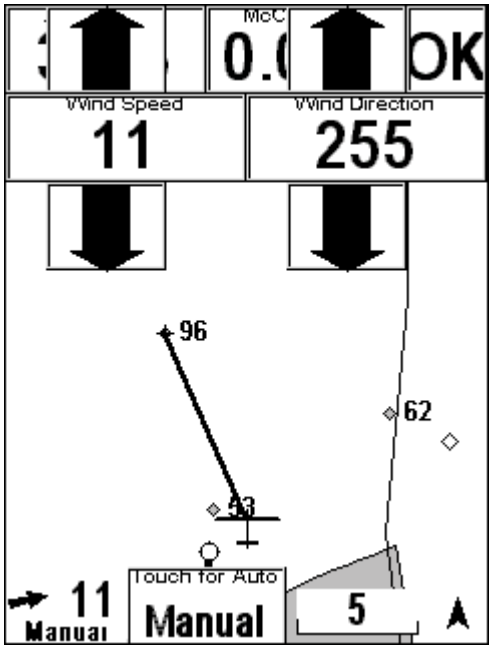

Figure 11. Touch the wind icon to set the vector wind speed and direction.

3.3.4 Flying Tasks

Task Declarations

If you wish to electronically declare tasks for badge or record flights, turn on the **Declare Tasks** option (Section **4.8.5 Task Configuration**). On leaving the **Edit Task** screen, an option to declare the task will appear. If you select **Yes**, the task will be declared in the GPS-NAV at the current time. Do not re-declare a task unless you wish to change the declaration time. Be sure you have downloaded any previously declared flights from the GPS-NAV, as the new declaration turnpoints, date and time are appended to all flights when downloaded.

Tasks can be declared using points not in the GPS-NAV, but the GPS-NAV display and L-NAV will not navigate properly to the task points.

The Pocket-NAV holds many more turnpoints than the GPS-NAV. The secure flight declaration is created and saved within the GPS-NAV, not the Pocket-NAV. If you declare a task using points that are not in the GPS-NAV, a screen will appear asking if you wish to send the points to the GPS-NAV. If you answer yes, the points in the task will be transferred to the GPS-NAV, and the task will be declared and verified. If there is not enough space left out of the 250 points in the GPS-NAV, the last points will be overwritten with the task points. The L-NAV and GPS-NAV display will not be able to access the task points, or may access the coordinates but not the correct names, so navigation and final glide to these points has to be done on the Pocket-NAV. The best way to avoid this is to load the turnpoints that you want to use for tasks into the GPS-NAV before the flight.

All declared tasks are verified by sending the coordinates from the GPS-NAV to the Pocket-NAV and checking them. A box appears indicating that the task has been verified after this is complete.

Starting and Stopping Tasks

A task becomes active on leaving the **Edit Task** screen. (See **Section 4.2 Edit Task**.) A **Start** button appears below the **Distance Box** when the task is activated. Touching **Start** will start the task timer and make the first turnpoint (not the start point) the active navigation waypoint. To time a task on the Pocket-NAV, push **Start** as you go through the start gate. To re-start a task, simply select the start point, or the first point in the task, as the navigation destination and the **Start** button will reappear. Touch the destination waypoint at the upper left of the screen and then touch the first task turnpoint on the list that appears. (See Figure 8 above.)

A **Finish** button appears when the task legs have been completed and the glider is within 10 km of the finish point. Touch **Finish** to stop the task timer. Task results during and after the flight can be seen on the **Show Task** page.

Rounding Turnpoints

At small scales, the turnpoint arrival radius and logged position points are shown on the map. (See Figure 6 above.) This provides visual verification that you have achieved a turnpoint. Automatic zooming at turnpoints can be selected, see Section **4.8.5 Task Configuration**, so that you can see the turnpoint radius easily without manually changing scales. The scale switches back on leaving the turnpoint area, and while thermalling. We recommend using automatic zooming at turnpoints on assigned contest tasks and on badge and record tasks, but not on cats cradle or pilot option tasks.

The **Auto Switch TPs** option, also discussed in Section **4.8.5 Task Configuration**, causes the next turnpoint to automatically be the current navigation destination. Automatic turnpoint switching occurs as soon as the glider enters the turnpoint arrival radius, and provides another verification that the turnpoint has been reached.

Prescribed or Assigned Area Tasks

This is a new type of contest tasks that involves flying anywhere into an area defined as a large circle or pie wedge around a turnpoint. Figure 12 shows a typical prescribed area task.

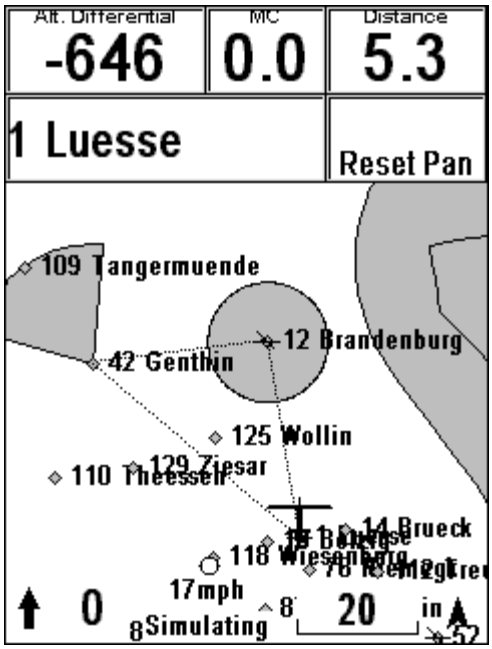

Figure 12. A prescribed (or assigned) area task.

The example task is from Luesse into a ten-kilometer circle around Brandenburg, into a 20-kilometer radius pie wedge to the north and west of Genthin, and return to Luessse. The gray area to the left is controlled airspace surrounding Berlin. To display the prescribed areas, turn on **Prescr. Area Task** under **Configure**, **Task Configuration**. Enter the task in the **Edit Task** screen. The screens shown in Figure 13 will appear, one after the other, when you press **Done** on the **Edit Task** screen. The Radii and radial angles shown in Figure 13 correspond to the areas depicted in Figure 12.

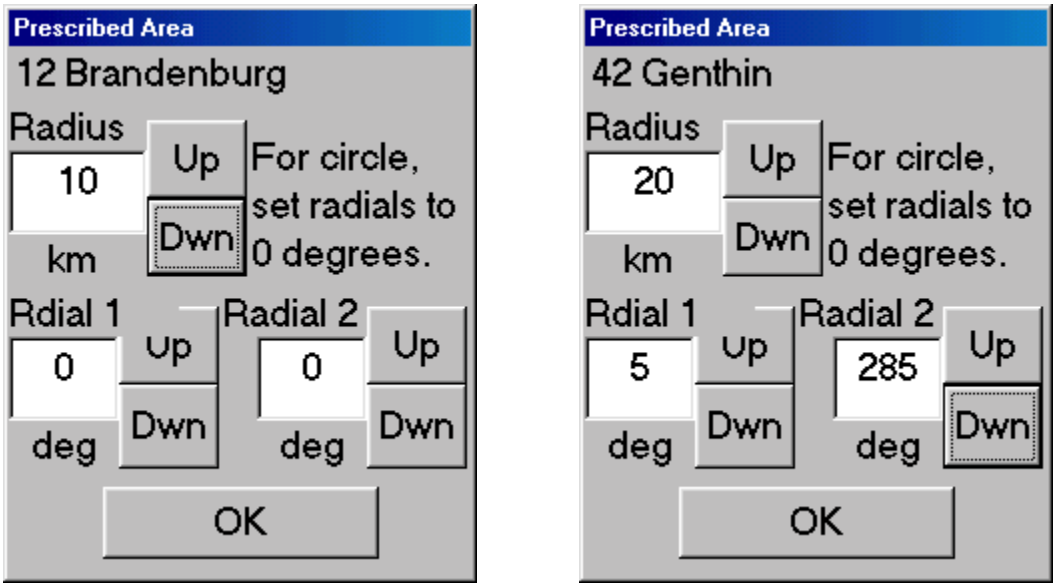

Figure 13. Setting up a prescribed or assigned area task.

If you are flying this type of task in an area with surrounding special use airspace, be careful that all relevant airspace is shown on the map. The Pocket-NAV trims the SUAs displayed to a rectangle that includes all the

loaded waypoints. If a task uses a turnpoint on the edge of the rectangle and includes a large area around it, relevant airspaces may not be shown on the map.

3.3.5 Using the Pocket-NAV with the L-NAV or S-NAV

We recommend that you use the Pocket-NAV as your final glide computer and leave the L or S-NAV on one page throughout the flight. The Pocket-NAV does not require as much changing of pages, and pages do not look similar. This reduces the workload and the possibility of confusion. Using both the Pocket-NAV and the L/S-NAV final glide computers can be tempting, but provides little or no useful information and increases eyes in the cockpit time. Leaving the L/S-NAV on one page throughout the flight means that the numbers displayed are always in the same location and mean the same thing – you don't have to figure out which page you are on to interpret what a number represents. If you prefer the L or S-NAV final glide computer, shut off the Pocket-NAV final glide information on the **Final Glide** page under **More Configure**.

The L-NAV gets glide distance information from the GPS-NAV, and cannot provide final glide information to waypoints that are not in the GPS-NAV. If a waypoint is chosen on the Pocket-NAV that is in the GPS-NAV, the L-NAV will provide glide information to the point. If a waypoint not in the GPS-NAV is chosen, the L-NAV will remain on the last point chosen that is in the GPS-NAV.

MacCready, ballast and bug settings on the L-NAV and S-NAV are slaved to the Pocket-NAV. Numbers entered on the Pocket-NAV are sent to the L/S-NAV. Numbers set on the L/S-NAV are not sent to the Pocket-NAV, and will change back to the numbers on the Pocket-NAV. Use the Pocket-NAV to set MacCready, ballast and bugs. If final glide information is turned of on the Pocket-NAV, MacCready, ballast and bug settings are not sent and the L/S-NAV will work normally.

The L/S-NAV sends wind and altitude data to the Pocket-NAV. The wind used on the Pocket-NAV is either the L/S-NAV automatic wind or the wind set manually on the Pocket-NAV. To use the automatic wind, touch the wind arrow and touch the **Manual** button that appears in the bottom center of the screen. (See Figure 11.) Repeat this operation to switch back to manual wind. The L/S-NAV winds and altitudes are more accurate than those from the GPS-NAV.

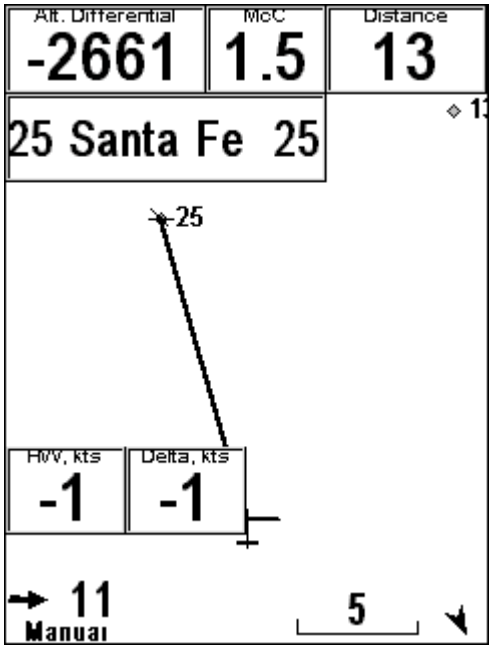

Figure 14. Real time headwind/tailwind and Delta wind.

The real time headwind/tailwind and resultant delta wind are shown on touching the wind arrow on the Pocket-NAV screen. (See Figure 14.) The "Delta" wind is useful for finding atmospheric convergences and wind changes. The real time headwind or tailwind (on the left in the figure) is sent from the L/S-NAV. The resultant delta wind is the headwind or tailwind calculated from the vector wind and the GPS groundspeed and track. The resultant wind is generally older than the real time wind from the L/S-NAV, especially during cruising. A difference in these two winds indicates a change in the wind, or an error in the instrumentation. The difference is displayed as the value labeled "Delta". If delta remains over about 4 knots for several seconds it indicates that the wind has changed. If it is over 2 knots most of the time it indicates that the true airspeed calibration is poor.

3.3.6 Using the Pocket-NAV with the GPS-NAV Display

The Pocket-NAV can display all the relevant information available on the GPS-NAV display. We recommend not looking at the GPS-NAV display if you are using the Pocket-NAV because it does not provide any additional information, and it increases the time looking inside the cockpit to use an extra instrument.

Because the Pocket-NAV and the GPS-NAV can contain different waypoints, it is not always possible to show the same navigation point on both instruments. If the Pocket-NAV is using a waypoint that is in the GPS-NAV, waypoints selected on the Pocket-NAV are sent to the GPS-NAV and shown on the display. If the waypoint is not in the GPS-NAV, no information is sent from the Pocket-NAV and the GPS-NAV display will work independently from the Pocket-NAV. Waypoints selected on the GPS-NAV display are not sent to the Pocket-NAV.

Note that the L /S-NAV will show final glide information to the waypoint selected in the GPS-NAV, not the Pocket-NAV, if they are different.

If you wish to use the GPS-NAV display, you can shut off the Pocket-NAV with the power button (usually at the middle of the bottom edge.)

4.0 Main Menu

Touching the distance button in the upper right corner will show the main menu.

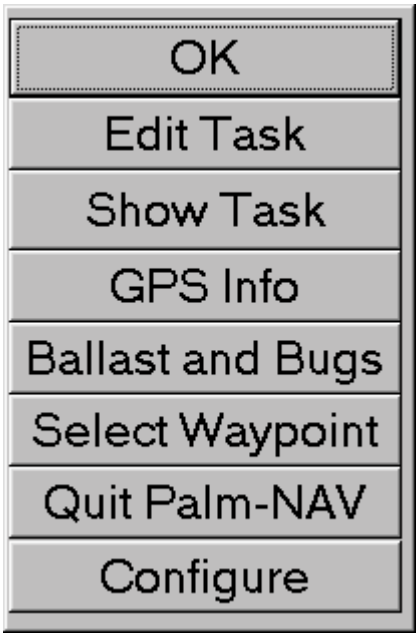

Figure 15. Main Menu (Touch distance box at the upper right of the screen.)

4.1 OK

The **OK** button returns you to the main screen. Pushing any OK button in the Pocket-NAV program returns to the main flying screen.

4.2 Edit Task

The Pocket-NAV allows you to easily enter and save tasks. Tasks are saved as a string of numbers, which means you will find odd tasks have been saved if you change waypoint files, for example, because you go to a different soaring site. This also means that if you change waypoint files temporarily, for example to look at the layout of a site, and then change back your saved tasks will remain.

Many pilots wish to enter one or more tasks well before a flight. You can enter tasks using the simulator, exit the program, and use these tasks later with the Pocket-NAV connected to the GPS-NAV. We recommend that you load the same waypoint file into both the Pocket-NAV and the GPS-NAV. This allows you to use the GPS-NAV data in flight (choose yes to "Use GPS-NAV waypoints only?" on start up, see Section 3.1) and to enter tasks in the Pocket-NAV using the simulator, when the GPS-NAV is not connected. Using the same file ensures that the turnpoints and tasks are the same.

To check the task and view distances, see Section **4.3 Show Task**.

To electronically declare tasks for badge and record flights see Declare Tasks On in **Section 4.8.5 Task Configuration**.

4.2.1 Single Task Configuration

See Section **4.8.5** below to change the **Task Configuration** between multiple and single tasks. This section assumes the program has been configured for a single task. If you do not plan to enter and save multiple tasks, this configuration results in simpler operation and fewer screens. If you wish to enter and save multiple tasks, see Section **4.2.2 Multiple Tasks Configuration.**

Push **Edit Task** and a task entering and editing screen will appear (Figure 16). The available turnpoints are to the lower right and task turnpoints, when added (**Insert** or **Replc** for replace), are to the upper left. Select the turnpoint on the right and where you want to insert, replace or **Del** (delete) on the left. **Done** saves the task and returns you to the main screen. The task is shown as dotted lines on the map. The task is sent to the GPS-NAV, and it is saved and will appear the next time you touch **Edit Task**. To delete a task, simply delete all the turnpoints in it.

Not all waypoints appear in the task-editing screen. Only turnpoints, waypoints with "T", "S" or "F" designations in the waypoint file, are shown.

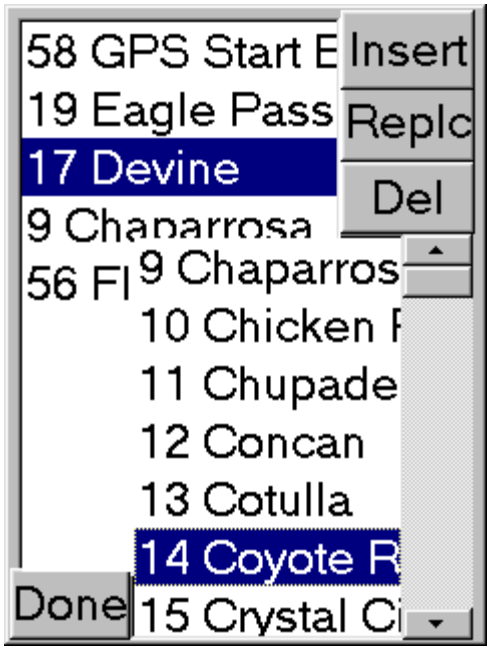

Figure 16. "Edit Task".

4.2.2 Multiple Tasks Configuration

See Section **4.8.5** below to change the **Task Configuration** between multiple and single tasks. Touch **Configure**, **Task Configuration**, and turn **Multiple Tasks On** if you wish to enter and save multiple tasks.

The Pocket-NAV allows you to enter and save up to ten tasks. Touching **Edit Task** causes the task selection screen to appear, Figure 17. Choose the task you wish to edit and touch **OK**. The task entering and edit screen described above (Figure 16) will appear.

Pressing **Done** on the task entering and editing screen saves the task chosen and sends it to the GPS-NAV. If you are using a GPS-NAV display, you will find that the task chosen on the Pocket-NAV is always sent to the GPS-NAV as Task A. Thus the current task on the Pocket-NAV is always Task A on the GPS-NAV, even though it could be another task on the Pocket-NAV.

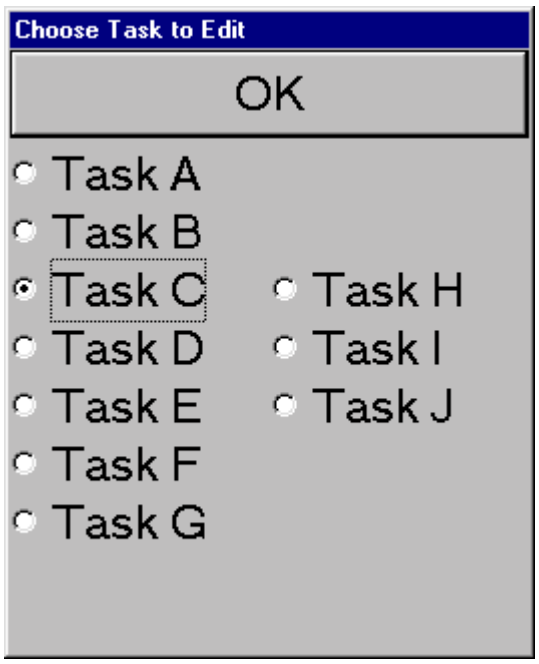

Figure 17. Task Selection Screen appears if **Multiple Tasks On** has been chosen

4.3 Show Task

Selecting "Show Task" from the main menu shows the task legs, distances, speeds and times. Figure 18 shows the screen for a task that has been started (at 8:58:41). Touching the **Estimate Speed** box (72 in the figure) allows setting the speed manually to provide an estimate of the remaining time to complete the task and the arrival time (**ETA**).

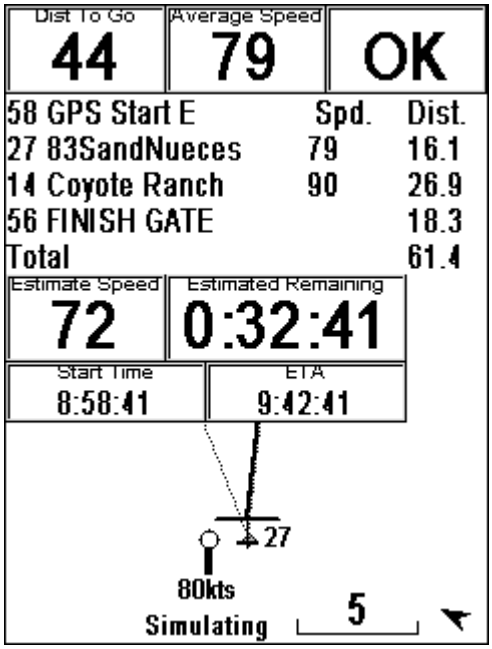

Figure 18. The Show Task screen.

This screen is useful for verifying tasks entered and on pilot option or cat's cradle tasks. See Section **3.3.4 Flying Tasks** for a description of starting and flying tasks. The **Show Task** page does not currently show useful information for prescribed area or assigned area tasks.

4.4 GPS Info

Touching **GPS** on the main menu shows latitude, longitude, ground speed, time (UTC), GPS-NAV pressure altitude and GPS-NAV altitude. Both altitudes are based on the pressure sensor in the GPS-NAV, not the GPS altitude. The pressure altitude is the altitude assuming a sea level pressure of 1013.2 mBar (29.92 in) and the altitude uses the pressure set on the **Set GPS Altitude** page. The altitude, shown on the right, should agree roughly with your altimeter. **OK** makes this information disappear.

4.5 Ballast and Bugs

Touching **Ballast and Bugs** allows setting the amount of water ballast (% of full water) and a bug or dirty wing degradation factor. This information is only relevant to the final glide computation.

4.6 Select Waypoint

This presents a scrollable, alphabetic list of all the waypoints. To search turnpoints only, choose **Edit Task**. (A task can contain only one turnpoint if desired.)

4.7 Quit Palm-NAV

This exits the Pocket-NAV program. Information in **Show Task** is erased. You must quit the program and re-start it to change from simulating to running with a GPS-NAV, or vice versa.

4.8 Configure

Selecting **Configure** from the main menu allows changing several configuration options such as airspace and waypoint files in use, units, airspace warning margins, etc. All settings are saved on exiting the program.

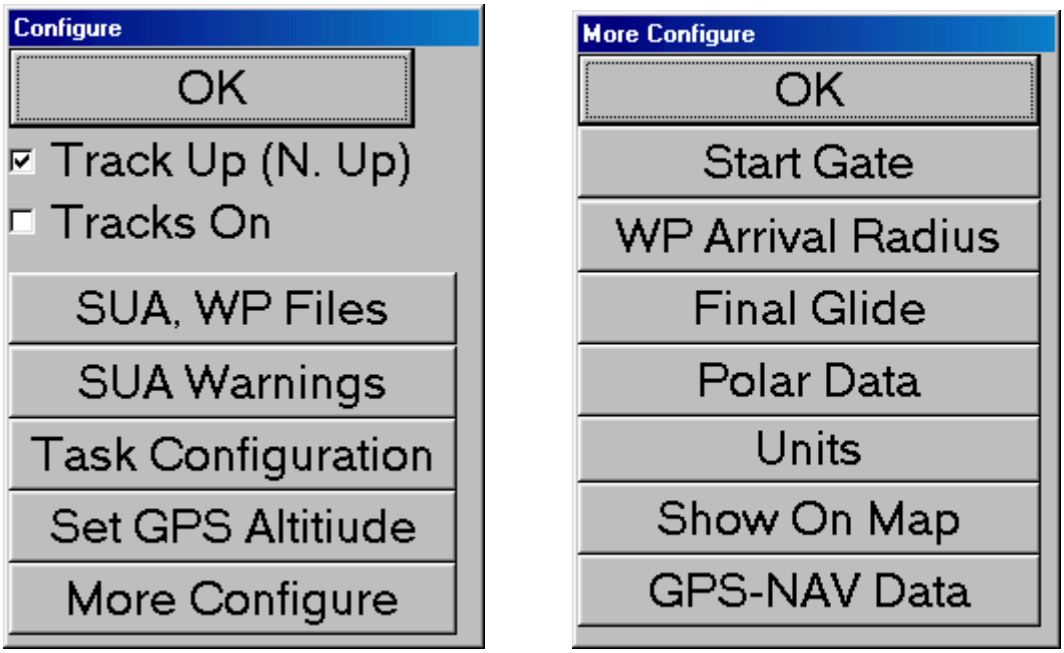

Figure 19. The "Configure" and "More Configure" screens.

4.8.1 Track Up (N. Up)

Checking this box orients the map track up, such that the glider is headed toward the top of the moving map. Un-checking it results in north up, with the glider track direction shown by an arrow in the middle of the screen.

As mentioned above, we recommend flying with the map oriented in the direction of flight, or in track up, as shown in most of the figures. When you get used to using the moving map in track up you will find that you have eliminated a step in interpretation. In track up, when the bearing line is straight up you are headed directly toward the waypoint.

4.8.2 Tracks On

Checking this box results in logged data points appearing on the moving map display. This feature is extremely useful for returning to thermal or to wave lift. Un-checking the box shuts the tracks off. They can be turned on or off at any time. The map can become cluttered with tracks on local flights.

4.8.3 SUA, WP Files

Touching **SUA, WP Files** allows selecting different waypoint and Special Use Airspace data files. This screen also appears when the program is started and no waypoint data is available. See Figure 3 above in Section **3.3.1 Waypoint and SUA Files**. This feature is not often used in flight.

Previously loaded files appear on the left, and will be retained if they are not deleted. If you have a duplicate set of waypoints in the GPS-NAV and in the Pocket-NAV, be sure not to load both files. If "GPS-NAV Waypoints" and the duplicate Pocket-NAV waypoint file are both shown on the left, they will both be loaded and appear on the Pocket-NAV as duplicates.

4.8.4 SUA Warnings

Touching SUA Warnings allows changing the altitudes and horizontal distance at which airspace alarms are activated. The GPS will beep to warn the pilot if the glider is within the **SUA warning margin** below the airspace floor and within the horizontal margin surrounding the airspace. The beeping can be shut off by touching **Off** in the warning message. (See Figure 21.) The warning will re-start if you leave and re-enter the airspace warning area. If you are circling near the edge of an SUA, the alarm can be re-activated on each circle. Touch the **5 Min** button to shut the alarm off for five minutes. Touching the **SUA Altitudes** button will make the **SUA Altitudes** display appear.

<u>SUA Altitude Warning Margins</u>
SUA Altitudes (See Figure 22) allows setting the ignore and warning altitudes for airspace floors. Airspace units are set independently from other altitude units on the **Units** page; the default is feet. The airspace floor, or base, is entered in the SUA data files. If no airspace floor, or "SFC", is entered in the data file, 0 is assumed. SUAs with a floor above the **Ignore SUAs above:** setting are excluded from the display and warnings until the value is reset. For example, on a day when you do not expect to climb above 5,000 feet there is no reason to display airspace with floors above 6,000 feet. If you climb higher than expected, you can change the ignore altitude and see the higher airspace. Setting this value to 0 will turn off all airspace depictions and warnings.

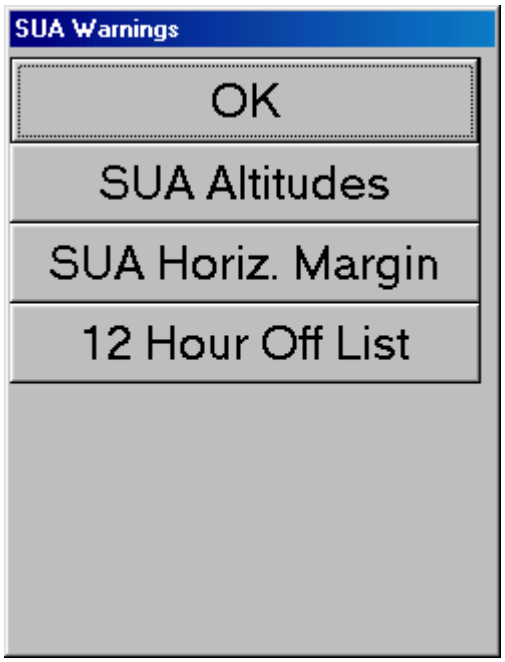

Figure 20. SUA Warnings

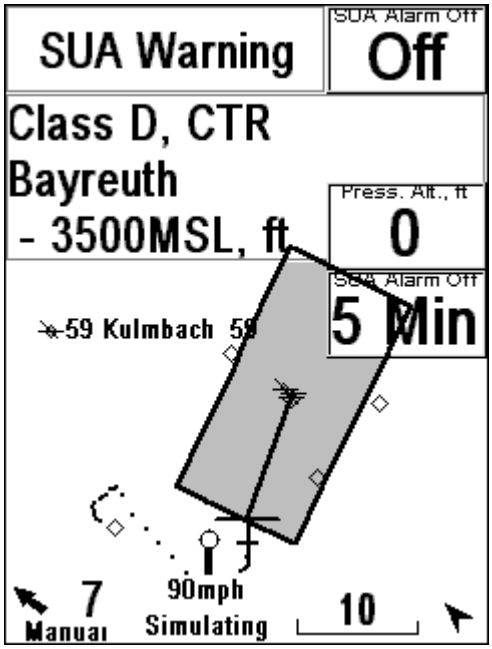

Figure 21. SUA warning message for the Bayreuth Class D airspace.

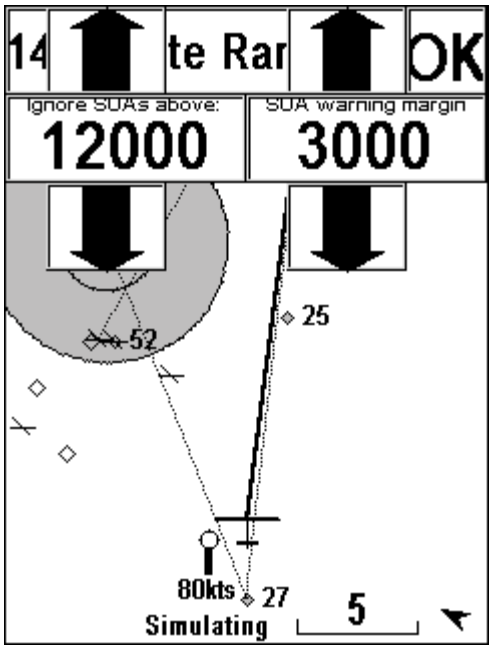

Figure 22. Setting "Ignore SUAs above" and "SUA warning margin" altitudes.

Horizontal Warning Margin

Touching SUA **Horiz. Margin** allows setting the lateral distance from airspace at which the alarm will activate. This should be set large enough (e.g. 500 to 1000 meters) to allow time to consider what the alarm is for and to make a turn.

12 Hour Off List

Selecting **12 Hour Off List** displays the list of SUAs that are currently shut off for twelve hours. SUAs that are not currently active (for example, gliders are allowed during the weekend) can be shut off for a period of twelve hours by touching the **Off** button that appears when an SUA displayed on the map is touched. (See Section **3.3.2**.) The example in Figure 23 shows three SUAs that have been turned off, and will not appear on the map display. To turn an SUA back on, select it (touch it) in the list and touch **On**. The list can also be reached be touching the **List** button that appears when an SUA is touched.

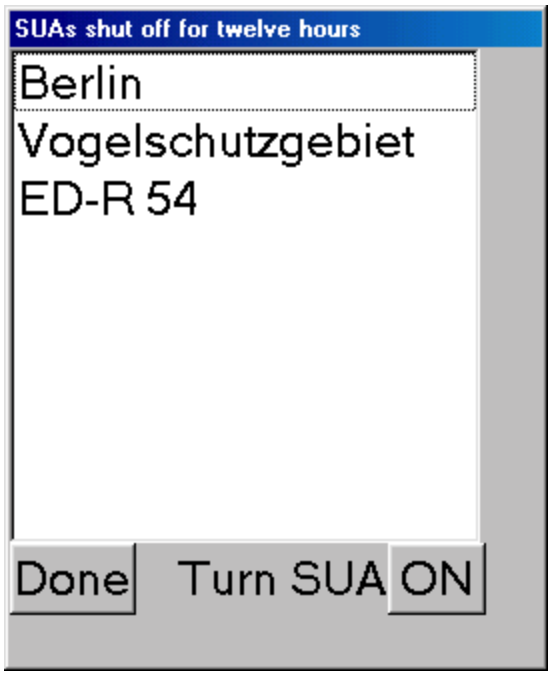

Figure 23. List of SUAs that are currently shut off.

4.8.5 Task Configuration

The **Task Configuration** screen is shown in Figure 24. Six options can be selected based on pilot preference.

Auto Switch TPs causes the turnpoint to switch to the next turnpoint in the task when the glider enters the arrival radius of the current turnpoint. The navigation point and distance change, making it obvious that the current turnpoint has been reached.

Auto Zoom at TPs causes the scale to zoom in as a selected turnpoint is approached. The scale switches back to the previous setting at 0.5 Km on leaving the turnpoint, or 60 seconds after the first switch if **Auto Switch TPs** is also on. We recommend using this feature on assigned contest, badge, and record tasks but not on pilot option or cat's cradle tasks.

Multiple Tasks On allows editing and storing up to ten tasks. If you are not using more than one task at a time, operation is simpler with this feature turned off.

Declare Tasks On allows making electronic task declarations for badge and record flights.

Show FAI Sector draws the FAI sector, with legs three kilometers long, at task turnpoints for badge and record flights.

Prescr. Area Task allows displaying circular or pie wedge shapes around turnpoints for the new prescribed or assigned area tasks. See **Section 3.3.4 Flying Tasks, "**Prescribed or Assigned Area Tasks". Be sure to turn this feature on only if you are flying this type of task or extra screens will appear each time you edit a task.

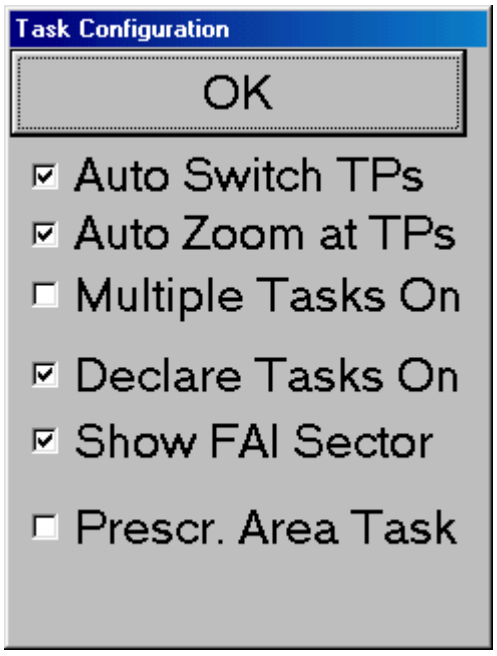

Figure 24. Task Configuration Screen

4.8.6 Set GPS Altitude

This screen allows changing the GPS "pressure" altitude by changing the pressure setting. It is normally used for setting the field elevation before takeoff. The larger up and down buttons change the value by a larger amount.

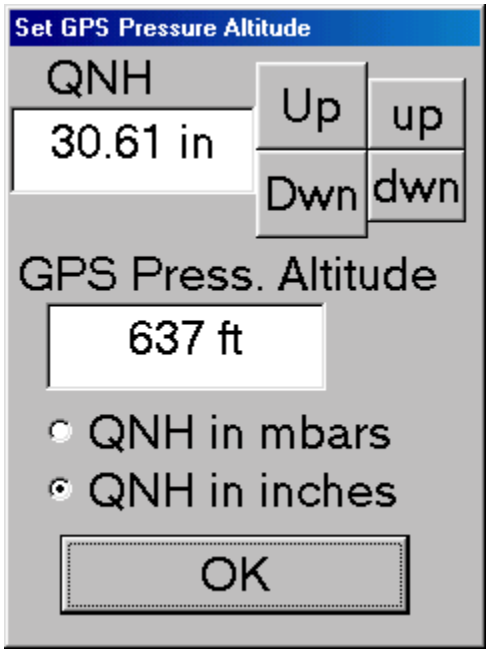

Figure 25. Set GPS Altitude.

The units of GPS altitude are as selected under "Alts" (not "SUA Alts") in the **Units** screen. The altitude value is used for final glide calculations if there is no L/S-NAV connected, and will be used in the future for SUA and start gate altitude warnings where MSL altitudes are specified. It is displayed, together with the pressure altitude, by touching **distance box, GPS Info**. The altitude is from the pressure transducer in the GPS-NAV, not the GPS altitude. GPS altitudes are currently very accurate, but are not used by air traffic control or by the IGC.

4.9 More Configure

4.9.1 Start Gates

Two start gates are available. The perpendicular start gate is a line perpendicular to the first task leg. The cylindrical, or US, start gate is a cylinder of limited height around the task start point. Use an SUA data file to create other start gate shapes (see Appendix A). The start gates only appear if a task has been entered. Start and finish times are not computed automatically, but are recorded when the "Start" and "Finish" buttons are pushed.

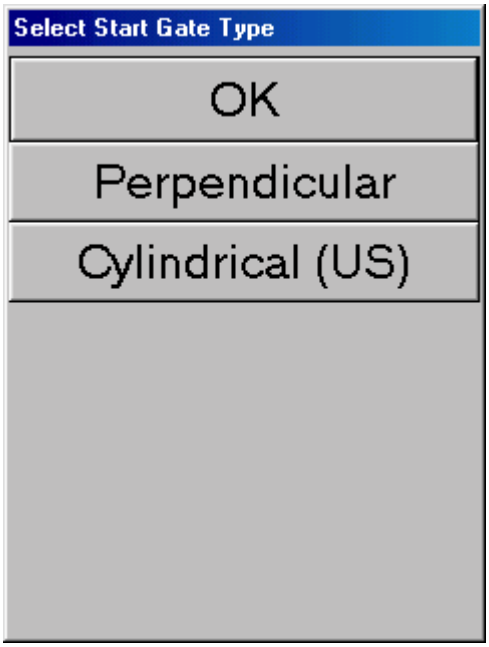

Figure 26. Select the Start Gate Type.

The task can include a variable length start line perpendicular to the first leg. A zero length setting shuts this feature off. Changing the perpendicular gate length (**Start Gates**) requires using the stylus keyboard, a small keyboard that appears at the bottom of the Pocket-PC screen. The keyboard is variously called the "SIP" or the "Input Panel" on Palm or Pocket-PCs. See Section **2.0 Setting up the Pocket-PC**.

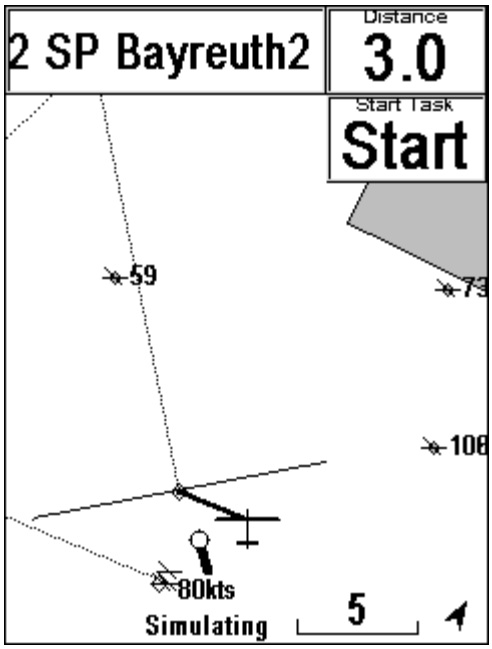

Figure 27. Task entered, start line perpendicular to first leg.

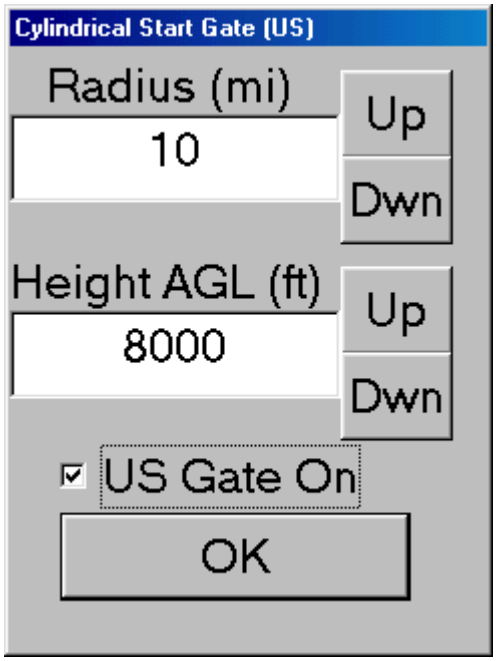

Figure 28. US or cylindrical start gate set up.

Selecting **US Gate On** and entering a radius and height will cause the start cylinder to appear around the first point in a task. Be sure that "Ignore SUAs above:" altitude is set to an altitude above the start height. See Section **4.8.4 SUA Warnings** above. Set the GPS pressure altitude to the field elevation before takeoff. (Section **4.8.6**)

4.9.2 WP Arrival Radius

Changing the **WP Arrival Radius** requires using the stylus keyboard, a small keyboard that appears at the bottom of the Pocket-PC screen. The keyboard is variously called the "SIP" or the "Input Panel" on Palm or Pocket-PCs. See Section **2.0 Setting up the Pocket-PC**.

For contest flying, the waypoint arrival radius should be set at the distance of arrival for scoring. (This is usually one half kilometer or one-quarter mile.) If the distance units are in miles or nautical miles (see Section **4.9.5 Units**) the editing units are given in thousandths of a mile, such that 250 equals 0.25 or one quarter mile.

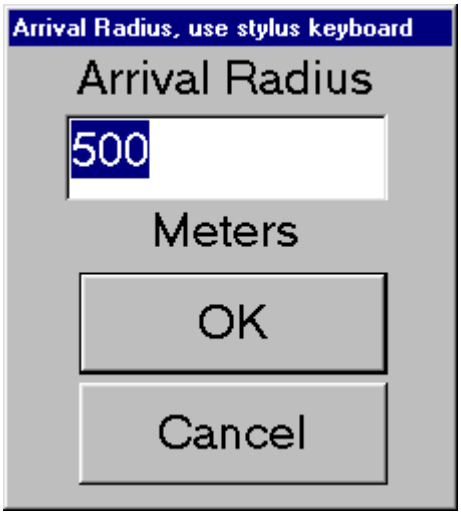

Figure 29. Setting the arrival radius or start gate length requires using the Pocket-PC stylus keyboard. (The keyboard is not shown.) The units are in thousandths of miles if miles or nautical miles are selected for the distance units.

4.9.3 Final Glide

Final Glide Info On turns the final glide computer on and off. **Total Energy FG** includes the current true airspeed, from the L/S-NAV, to be used in the final glide computation. If no L/S-NAV is connected this option has no effect. The total energy height is normalized to the best L/D speed at the current flying weight. If you are flying above the best L/D speed, the additional energy is added to your height. If you are flying below best L/D speed, the energy equal to the dive needed to reach best L/D speed is subtracted from your height. **Differential Alt.** displays the final glide altitude as the difference between your current altitude and the required altitude. For example, -200 ft. means that you are 200 feet below glide slope. The altitude is taken from the L/S-NAV if present, or else from the GPS-NAV. **Arrival Height Margin** allows setting the height above the ground at which you wish to arrive on final glides.

.

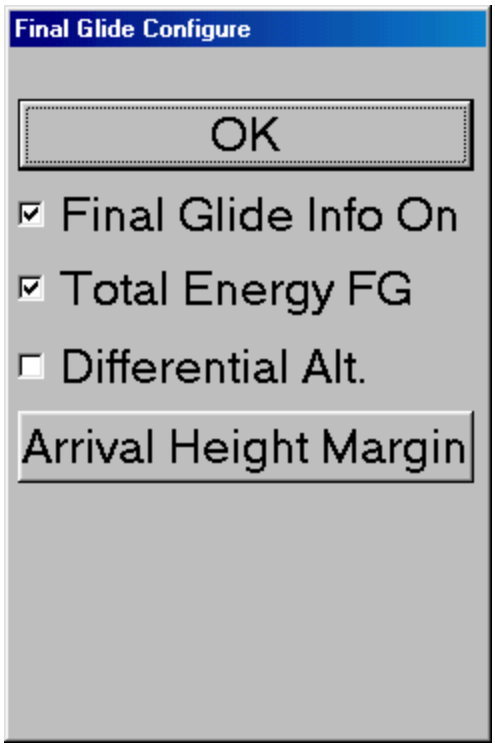

Figure 30. Final Glide Configure.

4.9.4 Polar Data

These screens (there are two screens) allow setting the polar data for the sailplane for final glide computations. Set the numbers using the keyboard and stylus as for the arrival radius discussed in Section **4.9.2 WP Arrival Radius**. The first screen shows maximum ballast, empty weight (including pilot, no ballast), and best glide ratio. The second screen (which appears when you touch **OK** on the first screen) shows the speed at which the best glide ratio is obtained (at the empty weight) and "**V2**", which is the speed that corresponds to a sink rate of 2 m/s. These numbers are the same as those in the Cambridge L-NAV, and can be taken from the manufacturer's data for the glider easily for most German made gliders.

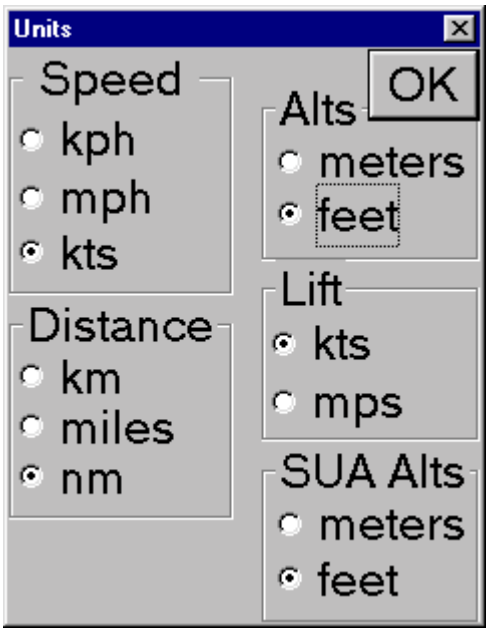

Figure 32. Selecting operating units for the Pocket-NAV.

4.9.5 Units

Select the desired units on the **Units** page as in Figure 32.

4.9.6 Show On Map

This page allows setting various options to show on the map display. Selecting several items will result in a cluttered screen. These are easily experimented with by running the simulator. Other waypoints are all waypoints other than turnpoints, indicated by a "T" in the waypoint files.

Figure 33. Show Waypoint Information.

4.9.7 GPS-NAV Data

This screen allows transferring flight logs from the GPS-NAV to the Pocket-PC, transferring pilot information to and from the GPS-NAV, and sending waypoints from the Pocket-PC to the GPS-NAV.

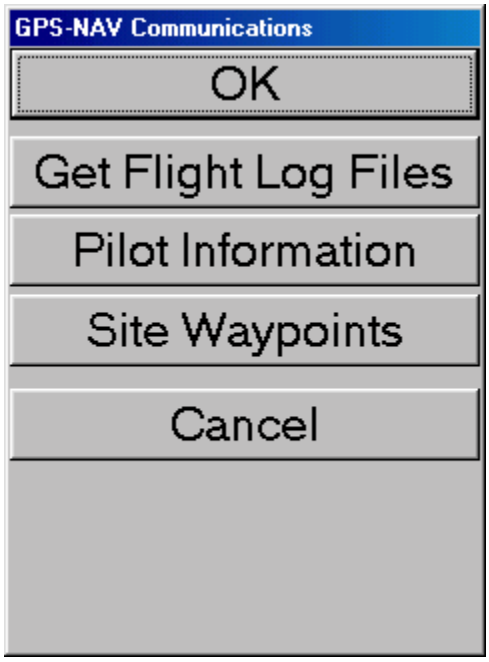

Figure 34. GPS-NAV Communications

Get Flight Log Files allows selecting and transferring flight logs. The files are put into a "Flights" directory within the "My Documents" directory on the Pocket-PC, and into a "Flights" directory on the compact flash card, if a card is present. The directories will be created if they do not exist already. Flights are saved as both secure ".cai" files and IGC format text files.

Pilot Information provides a means of viewing and changing the pilot information in the GPS-NAV.

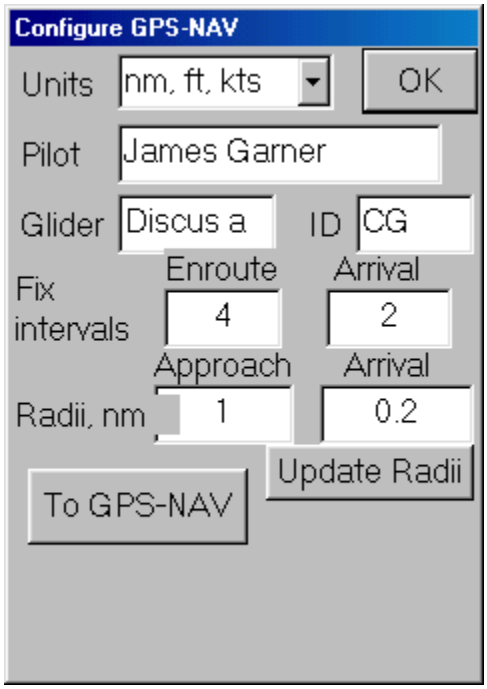

Figure 35. Configure GPS-NAV

The units are selected from a choice of four possibilities. Other items are set using the stylus keyboard. The "Update Radii" button shows the approach and arrival radii that will be sent to the GPS-NAV. These numbers are stored to the nearest 100 meters, and may be rounded off. When you change the approach or arrival radius, touch the "Update Radii" button to make sure you know what is actually being sent to the GPS-NAV. Changing the units at the top of the screen will change the units of the radii. Sending the data "To GPS-NAV" will erase any flight logs. (A message appears confirming that you want to do this.)

Site Waypoints sends the waypoints currently in the Pocket-NAV to the GPS-NAV, overwriting what is there. If more than 250 waypoints are loaded in the Pocket-NAV, the first 250 will be sent.

Appendix A Waypoint files

The Pocket-NAV imports waypoint files in the same format as the GPS-NAV files. An example is given below. The last field in each line is an optional comment field. The fourth field contains the elevation, and the fifth contains a designator that can be blank, or any combination of the following:

```
A airport
T turnpoint
L landpoint
H home
S start
F finish
R restricted
W waypoint
```

Lines beginning with "**" are comments and are ignored.

```
** Uvalde, Texas                 April 9, 1999
**+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
**                                                                            +
**                         Turnpoints for Uvalde, Texas                       +
**                                                                            +
**                          Contributed by Sam Fly '7F'                       +
**                                                                            +
**               Datum: 100 ( WGS84 ), Magnetic variation: -7.3               +
**                                                                            +
**                              Time zone: US/Central                         +
**         Summer offset from GMT is -5:00, and in winter it is -6:00         +
**                                                                            +
**               Latitude Range:     27:07.685N to   30:55.632N               +
**               Longitude Range:   101:01.023W to  098:16.351W               +
**                                                                            +
**             Last updated on Friday, April 9, 1999 at 18:29 MST             +
**                                                                            +
**           >>>>>>>>>> UNOFFICIAL, USE AT YOUR OWN RISK <<<<<<<<<<           +
**                                                                            +
**                   Always consult the relevant publications                 +
**                   for current and correct information. This                +
**                    service is provided free of charge with                 +
**                     no warrantees, expressed or implied.                   +
**                         User assumes all risk of use.                      +
**                                                                            +
**++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
1,29:11.281N,100:16.450W,1067F,TA,Anacacho    ,31 > 13  040
2,28:57.854N,099:37.510W,709F,TA,Batesville  ,33 > 15  060
3,28:34.062N,099:34.138W,550F,T,Big Wells   ,RR>Int   090
4,29:16.767N,100:26.040W,1106F,TA,Brackettvill,35 > 17  080
5,27:52.505N,099:23.733W,635F,TA,Callaghan   ,33 > 15  060
6,28:31.040N,099:49.077W,598F,TA,CarrizSprngs,31 > 13  040
7,29:20.157N,098:50.913W,772F,TA,Castroville ,33 > 15  060
8,28:14.898N,099:48.393W,650F,TA,Catarina    ,31 > 13  040
9,28:52.376N,099:59.372W,680F,TA,Chaparrosa  ,33 > 16  060
10,29:37.681N,100:22.472W,958F,TA,Chicken Rc  ,32 > 14  050
```

Appendix B Airspace, gate, road, river and border data files.

The Pocket-NAV reads SUA data files in a format developed by Tim Newport-Peace for airspace in the UK. User files can be created in that format.

Airspace for most of continental Europe is provided by Hans Trautenberg and is available from Cambridge Aero Instruments at no charge. The "Europe.sua" file contains this data. (The "Europe.sua" file is in a special, binary format.)

Airspaces with the last point identical to the first are closed and filled in with gray. Otherwise, a line is drawn without closing the shape (as in the coastline shown in Figure 36). This allows entry of any desired shape for display on the moving map.

Figure 36. Airspace map showing Class A, Class D, and the coastline for the UK

Example airspace data files from Tim's web site (http://www.spsys.demon.co.uk) are listed below. The first file, "User Defined File", gives a description of the format.

```
################################################################
###################### USER DEFINED  FILE ######################
################################################################
#
# This is an (almost) empty file in which you can define your own Display Data.
#
# All lines beginning # are considered comments and will be ignored.
#
# Each line consists of a Keyword and a value. These Keywords are defined
# as follows:
#
# TITLE=    Sections and Sub-Sections Always commence with a line beginning
#           TITLE=.
#
# INCLUDE=  When a line beginning INCLUDE=NO is encountered skip all text
#           until a line beginning INCLUDE=YES is encountered.
#           This will normally be on the line BEFORE a TITLE= line.
```

```
#           YES and NO are the only permitted Values.
#
# TYPE=     This defines the Type of Airspace. The permitted values are:
#           Definition          Abbreviation
#           CTA/CTR             C
#           AIRWAYS             A
#           RESTRICTED          R
#           PROHIBITED          P
#           DANGER              D
#           OTHER               O
#           TRAINING ZONE       Z
#           TRAFFIC INFO        I
#
#           The latter two are not currently in use, but may be used at
#           some future date.
#
# POINT=    This is always followed by a Lat/Long position, for example
#           POINT=N524033 W0014380. It is important that the construction
#           is followed exactly. If this is the first POINT= line AFTER a
#           TITLE=, drawing will commence from this point, otherwise a line
#           will be drawn from the previous point to this new point. The last
#           POINT will normally be the same as the first POINT.
#
# CLOCKWISE or ANTI-CLOCKWISE
#           This is always followed by a RADIUS keyword, a CENTRE Keyword and
#           a TO Keyword (The only valid place for RADIUS, CENTRE and TO
#           keywords is when describing an Arc or Circle.), and describes
#           an arc to be drawn Clockwise or Anti-Clockwise from the current
#           position, and should be constructed as follows:
# ANTI-CLOCKWISE RADIUS=8 CENTRE=N522734 W0014494 TO=N521948 W0014754
# or   CLOCKWISE RADIUS=8 CENTRE=N522734 W0014494 TO=N521948 W0014754
#           The units of Radius are Nautical Miles.
#
# CIRCLE=   Similar to Arc but with only RADIUS and CENTRE Secondary keywords.
#           e.g. CIRCLE RADIUS=10 CENTRE=N555700 W0032227
# WIDTH=    This Keyword describes the width of an Airway in Nautical Miles and
#           is only used in conjunction with an AWY keyword. If no WIDTH=
#           statement is given then 10NM will be assumed.
# AWY=      This is like the POINT= keyword and describes a point on the
#           centre-line of an Airway whose width has been previously given in
#           a WIDTH= statement
#           e.g. WIDTH=10
#           AWY=N555223 W0042667
# TOPS=
# BASE=     Each section of airspace requires a BASE= and TOPS= statement
#           in order that Air_Check can detect infringements. The BASE can be
#           defined as a Flight Level or ALT. TOPS will normally be a Flight
#           Level. For example:
#           WIDTH=10
#           BASE=2500ALT
#           TOPS=FL245
#           or
#           WIDTH=10
#           BASE=FL55
#           TOPS=FL245
#
# The file must finish with the word END
#
# Further Examples of the use of WIDTH= and AWY= can be found in the file
# AIRWAYS.AIR, and other Keywords in CLASS_A.AIR and CLASS_D.AIR.
#
# You can use this file to draw any shape you wish, for instance you could
# draw your Base Airfield's ATZ or Runway. The following sample data draws the
```

```
# Main Runway at Lasham.
#
# NOTE: POINTs etc. are in the format (d)ddmmss [degrees, minutes, seconds
#      and not (d)ddmm.mm [decimal minutes] as in previous issues.
#
INCLUDE=YES
TYPE=TRAINING ZONE
#
TITLE=Lasham Runway 09/27
#
POINT=N511112 W0010238
POINT=N511114 W0010238
POINT=N511119 W0010109
POINT=N511117 W0010109
POINT=N511112 W0010238
#
#
# End of File. Have Fun!
#
END

################################################################
###################### CLASS A AIRSPACE ########################
################################################################
#  Information Source:UK Air Pilot at 25/02/99
#
# All lines beginning # are considered comments and will be ignored.
# Sections and Sub-Sections Always commence with a line beginning
# TITLE=
# When a line beginning INCLUDE=NO is encountered skip all text until
# a line beginning INCLUDE=YES is encountered. This will normally be on
#the line BEFORE a TITLE= line.
# This allows easy tailoring of the files to omit irrelevant airspace.
#
############ UNOFFICIAL, USE AT YOUR OWN RISK ##############
# ALWAYS refer to UK AIR PILOT for definitive information. #
# This file is provided free of charge with no warrantees, #
# expressed or implied. User assumes all risk of use.      #
################################################################
#
INCLUDE=YES
TYPE=CTA/CTR
#
# COTSWOLD CTA ENR 2-1-5 dated 25-Feb-99
TITLE= COTSWOLD CTA-1
#
BASE=FL165
TOPS=FL245
POINT=N515038 W0030711
POINT=N514308 W0030746
POINT=N513135 W0030951
POINT=N512812 W0024437
POINT=N514646 W0023818
POINT=N515038 W0030711
#
TITLE=DAVENTRY CTA-2
#
BASE=FL45
TOPS=FL245
POINT=N532614 W0015024
POINT=N530952 W0014407
POINT=N530108 W0015300
POINT=N530732 W0020056
```

```
POINT=N532614 W0015024
#

################################################################
################ PROHIBITED/RESTRICTED AREAS ################
################################################################
#  Information Source:UK Air Pilot at 25/02/99
#
# All lines beginning # are considered comments and will be ignored.
# Sections and Sub-Sections Always commence with a line beginning
# TITLE=
# When a line beginning INCLUDE=YES is encountered skip all text until
# a line beginning INCLUDE=YES is encountered. This will normally be on
#the line BEFORE a TITLE= line.
# This allows easy tailoring of the files to omit irrelevant airspace.
#
############ UNOFFICIAL, USE AT YOUR OWN RISK ##############
# ALWAYS refer to UK AIR PILOT for definitive information. #
# This file is provided free of charge with no warrantees, #
# expressed or implied. User assumes all risk of use.      #
################################################################
#
INCLUDE=YES
TYPE=PROHIBITED
#
TITLE=P047 WINFRITH Dated 8-Oct-99 ENR 5-1-1-1
BASE=SFC
TOPS=1000ALT
CIRCLE RADIUS=1 CENTRE=N504052 W0021535
#
TITLE=P106 HARWELL P106 Dated 8-Oct-99 ENR 5-1-1-1
BASE=SFC
TOPS=2500ALT
CIRCLE RADIUS=2 CENTRE=N513430 W0011905
#
TITLE=P611 COULPORT/FASLANE Dated 1-Jan-98 ENR 5-1-1-2
BASE=SFC
TOPS=2200ALT
CIRCLE RADIUS=2 CENTRE=N560331 W0045159
#
```

Appendix C Loading the Pocket-NAV Software using a Personal Computer

To load the Pocket-NAV software on your Pocket-PC computer you must have Microsoft ActiveSync loaded on your PC and have communication enabled between the two computers. If you have trouble installing ActiveSync on your computer you may call us, but first we suggest the following.

Contained on the ActiveSync CD, which you should have received with your Pocket-PC, is a file titled README.doc. This file is in the Windows Word format and is titled "MICROSOFT ACTIVESYNC VERSION 3.0 READ ME FILE". This file provides information on installing and troubleshooting ActiveSync. Next you should contact either Microsoft or the manufacturer of your computer. If they cannot provide the answers you need, give us a call and we will try to assist you.

1. Insert the floppy disk titled Pocket-NAV Software into your floppy disk drive.

2. Open the start menu on the taskbar on the PC.

3. Choose "Programs", then "Windows Explorer". You now have a view of all of your computer's drives and the files contained on each drive. For further information on Windows Explorer please refer to the documentation received with your operating system.

4. If you have successfully loaded ActiveSync you should see an ActiveSync on your desktop, or you can find ActiveSync under "Programs" in the "Start Menu". When you connect the Pocket-PC to the PC (using the cradle and cable that came with the Pocket-PC) ActiveSync my start automatically. If it does not, open the program, allow it to establish a connection, and double click on the "Explore" icon. (If ActiveSync does not establish a connection with your Pocket-PC, try clicking "Files" and "Get Connected".) You will see the contents (folders and files) on the Pocket PC. Double click on the "Windows" icon and you will then see the folders and files contained in the "Windows" folder. Double click on the "Start Menu" icon (not the "StartUp" icon). It is into this "Start Menu" folder that you are going to copy the *PalmNAV-CEx.exe* file.

5. Go to the top of the left window in Windows Explorer (not in ActiveSync) and find the icon for the 3 1/2 Floppy (usually A:). Click the icon one time and you should be presented with the contents of the floppy disk that you inserted in step one.

6. Files can be copied and moved using drag and drop, or copy and paste. Copy and paste is described here. Place the mouse pointer on the file titled *-CExNAV.exe* and click once. With the file highlighted go up to the menu choices across the top of the window and click once on "Edit". You will be presented with a list of choices. Click once on "Copy". This action temporarily copies the *PalmNAV-CEx.exe* file to a place in your computer called the clipboard. The folders that you opened in step 4 should still be open (if not repeat step 4). Click one time to highlight the folder within the "Windows" folder titled "Start Menu". Once this folder is highlighted, go to the menu choices across the top of the window and click one time on "Edit". When you are presented with the list of options in "Edit", click once on "Paste". If a "no converter selected"

box appears, just click “OK”.

7. Remove the Pocket PC from the cradle and open the start menu. You should now see the PalmNAV-CEx listed as one of the choices.

8. If you want to load airspace or waypoint files into the Pocket PC from your computer, follow this same copy and paste procedure described above with the exception of the following. The airspace and waypoint files (titled something like *Omarama.dat*) are to be copied to the Pocket PC into the folder titled "My Documents".

Appendix D Loading the Pocket-NAV Software from a Compact Flash Card

If you are using a Compaq Aero 1500 series read the following. For other Compaqs, see the list of steps on the following page. Casio Palm-PCs do not currently allow transferring the program files from a compact flash card.

1. Remove the Compaq Aero from the shipping box and follow the manufacturers instructions to set up the Pocket PC using the set up wizard.

2. When you have successfully completed the set up procedure, press the reset button on the back of the Pocket PC (see the "Quick Start Guide"). After the Pocket PC has completely rebooted, insert the compact flash card into the Pocket PC (see the "Quick Start Guide" for location of card slot).

3. If the Pocket PC is running on battery power only, a box will be presented titled "PC Card detected in slot 1". Choose the "YES" option.

4. Press the "Start" button on the Task Bar across the bottom of the display. Select "Qlaunch" and "File Explorer". Files on the compact flash card are under "Storage Card". They can be copied and moved using drag and drop operations.

5. Click on "Storage Card" in the lower window. You are looking for the file called *PalmNAV-CEx.exe*. If you don't see it, click on the subdirectories until you find it.

6. Look for the "Windows" directory in the top window. Click the little plus sign next to it to show the subdirectories. Put the stylus down on *PalmNAV-CE.exe* in the lower window, and drag it to the "Start Menu" subdirectory (in the "Windows" directory) in the upper window, and lift the stylus. The file will be copied into the Start Menu, and its icon will be visible when you press the "Start" button.

7. Copy any data files you wish to use from the flash card to the "My Documents" subdirectory using the same technique. If the card is left in the Pocket-PC, data files in a "My Documents" subdirectory on the card will be available to the Pocket-NAV program.

8. Alternatively, you can run the program directly from the flash card be double clicking *PalmNAV-CEx.exe*.

You may install the Pocket-NAV Software on to your Compaq Aero 21XX by using the CF Backup option in Windows CE. The procedure is as follows:

1. Remove the Compaq Aero from the shipping box and follow the manufacturers instructions to set up the Palm PC using the set up wizard.
2. When you have successfully completed the set up procedure, press the reset button on the back of the Palm PC (see the “Quick Start Guide”). After the Palm PC has completely rebooted, insert the compact flash card into the Palm PC (see the “Quick Start Guide” for location of card slot).

3. If the Palm PC is running on battery power only, a box will be presented titled "PC Card detected in slot 1". Choose the “YES” option.

4. Press the "Start" button on the Task Bar across the bottom of the display. Select "Program" and then "CF Backup".

5. When the CF Backup/Restore Utility box appears, you will see two tabs, one titled "Backup" and the other "Restore". Select the "Restore" tab and then "Start". Choose YES when warned that restore will overwrite your current data. Choose OK when presented with the warning box asking you to close all active programs (this was accomplished in step 2 by rebooting the Palm PC). The Restore function will take a few minutes and may pause at 99%, be patient.
6. When the Restore is complete, follow the instructions in the message box. You will need to close the CF Restore/Backup Utility by clicking OK. Be sure to press the restart button as directed.
7. Remove the compact flash card, turn off the Palm PC and then turn it back on. Press the "Start" button on the Task Bar and you should see the Pocket-NAV program listed. The Pocket-NAV Software is now loaded and ready to run.